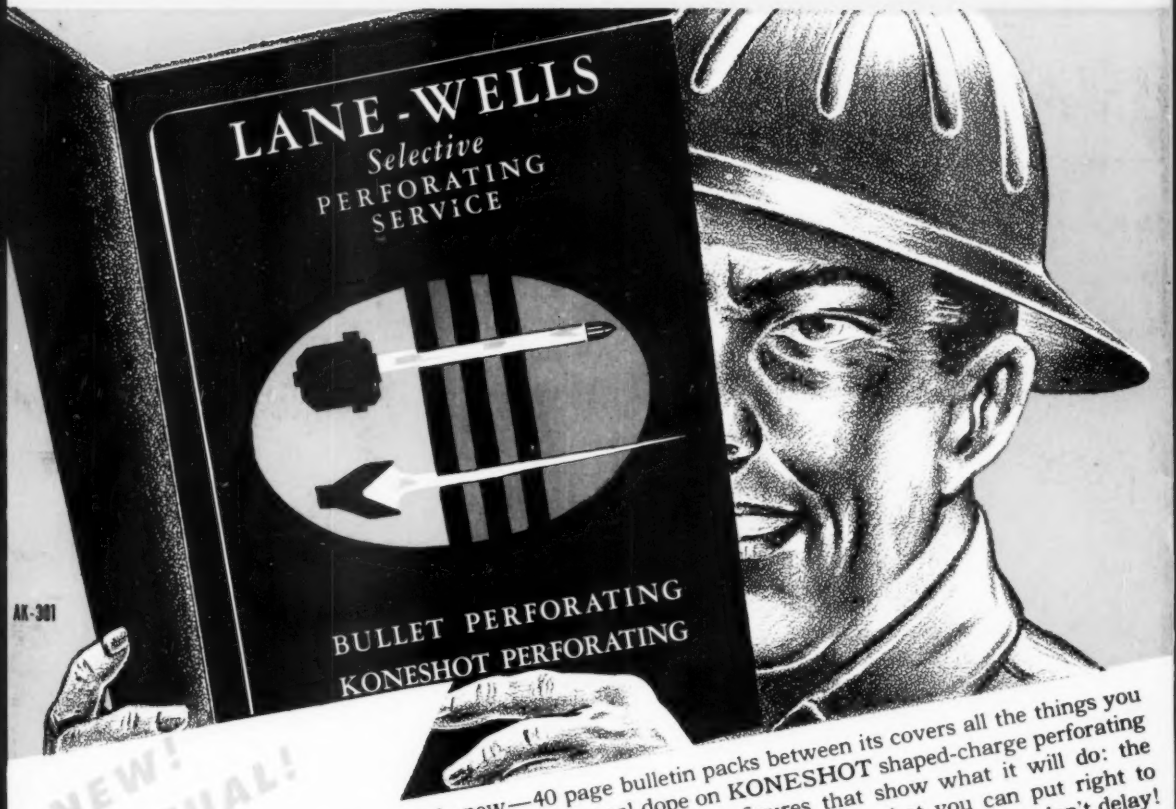
the OIL AND GAS JOURNAL

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PRICE 50 CENTS TABLE OF CONTENTS PAGE 25 JANUARY 12, 1950

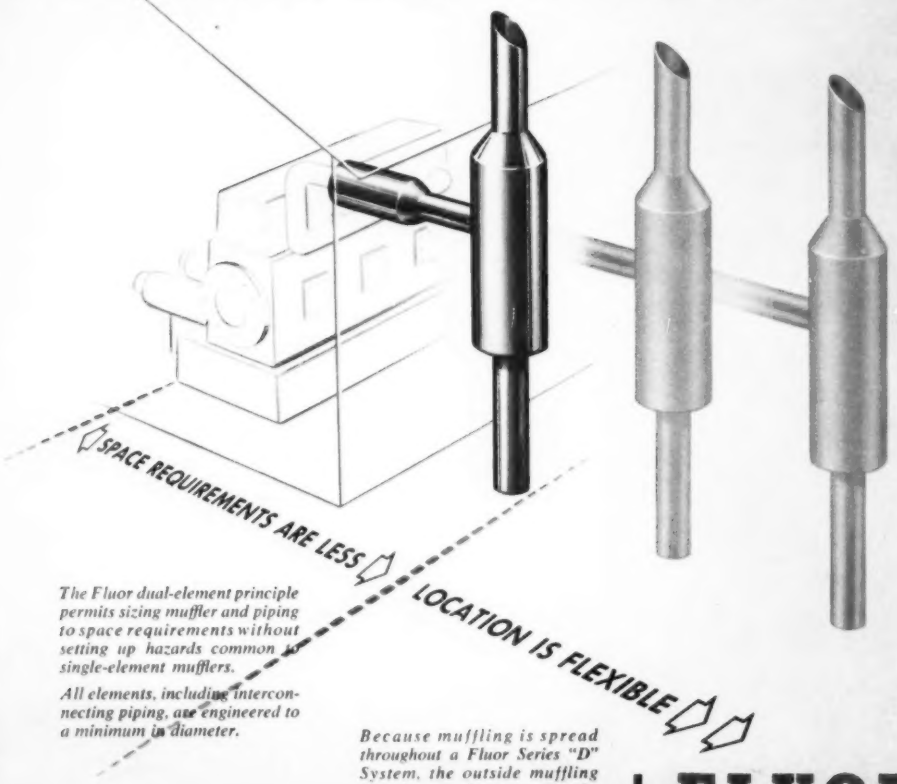
# See for yourself...

## the installation advantages of a FLUOR SERIES "D" MUFFLER SYSTEM

NO LONGER is ultimate muffling efficiency dependent upon trial-and-error locating of exhaust piping. With the Fluor Series "D," exhaust piping can be of *smaller* diameter, location of outside exhaust chamber *flexible* without affecting pressure drop or noise attenuation and pulsation reduction efficiency.

The reason lies in the unique dual-element design of this muffler *system*. Work is started on pulsative exhaust gases *at* the engine—noise and pulsation reflections are virtually eliminated *at* their source. The Fluor Series "D" Muffler is a *system* that incorporates *two* muffling elements—a primary element located in the immediate proximity of the engine and a secondary element located *at any desired spot* outside the engine room.

The Fluor Series "D" Muffler System is the answer to your muffling problems. In addition to installation flexibility it provides the highest muffling efficiency obtainable—*at a cost competitive with conventional mufflers.*




*The Fluor dual-element principle permits sizing muffler and piping to space requirements without setting up hazards common to single-element mufflers.*

*All elements, including interconnecting piping, are engineered to a minimum in diameter.*

*Because muffling is spread throughout a Fluor Series "D" System, the outside muffling chamber can be set at any desired distance from the engine room wall.*

**AVAILABLE FROM STOCK**—A Fluor Series "D" Muffler System to fit virtually any 2- or 4-cycle, 200 to 2400 HP diesel engine is available from stock. You need only submit engine room design and dimensions, make, model and RPM of engine and whether muffling system is to be air-cooled or non-air-cooled. Inquiries will be answered promptly.

**THE FLUOR CORPORATION, LTD.**

**FLUOR**

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DESIGNERS AND CONSTRUCTORS of Refinery, Natural Gas and Chemical Processing Plants.

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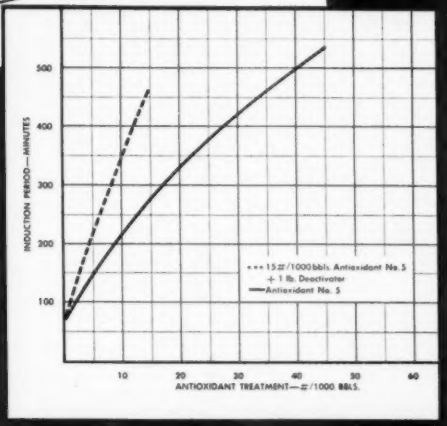
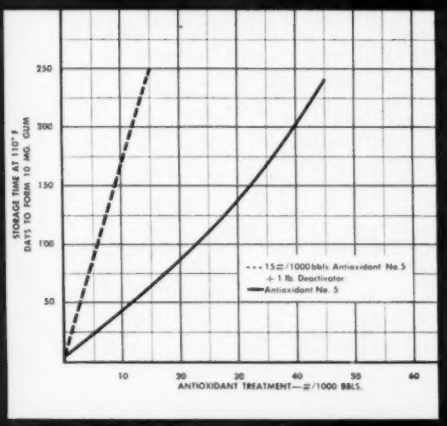
Offices in principal cities in the United States.

*Represented in the Sterling Areas by: Head Wrightson Processes Ltd., Teesdale House, Baltic Street, London, E.C.1., England*

## CASE HISTORY:




Results of induction period tests on stock containing 0.1 parts per million of copper, using Du Pont Antioxidant No. 5 alone, and combined with Du Pont Metal Deactivator.




Results of accelerated storage tests on the same stock using Antioxidant No. 5 alone and in combination with Du Pont Metal Deactivator.

# Du Pont Metal Deactivator *Saves 48% in* Antioxidant Treating Costs

As little as 0.1 parts per million of copper is barely measurable by ordinary analytical methods . . . yet in some gasolines it may be enough to almost double antioxidant treating costs.

In this actual case history, to obtain a 460 minute induction period, thirty-five pounds of Du Pont Antioxidant No. 5 per thousand bbls. were required. This antioxidant was selected as the most effective of the three Du Pont Gasoline Antioxidants for use in this particular gasoline. The addition of one pound of Du Pont Metal Deactivator reduced the antioxidant requirements for the same induction period to fifteen pounds, a dollar saving of 48%.

Under actual, but accelerated, storage conditions, the pattern was the same.

Here is documented proof of the effectiveness of Du Pont Metal Deactivator in stocks containing traces of dissolved copper. In accelerated oxidation tests, response to Du Pont Metal Deactivator often shows the presence of copper that has not been detected by ordinary analytical methods. Du Pont District Laboratories will be glad to run a Metal Deactivator test on your stocks for you. Just call your Du Pont Petroleum Chemicals representative.

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**Better Things For Better Living**
***...Through Chemistry***

# Petroleum Chemicals

Make Du Pont the Source for All of Your Gasoline Additives . . . Tetraethyl Lead Compounds (Motor Mix—Aviation Mix)—Antioxidants—**Metal Deactivator**—Dyes

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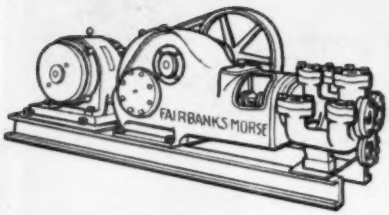
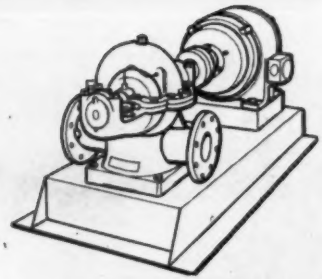
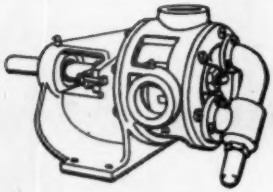


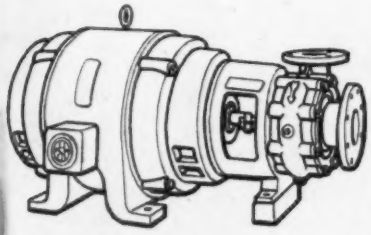

Power Pumps



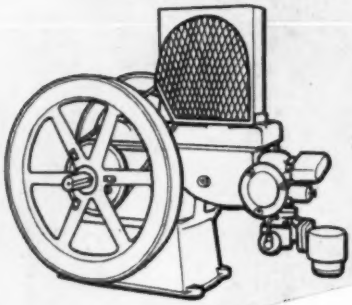
Centrifugal Pumps



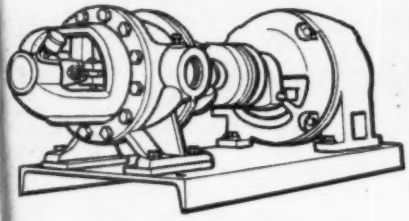
Rotary Pumps



Builtogether Pumps

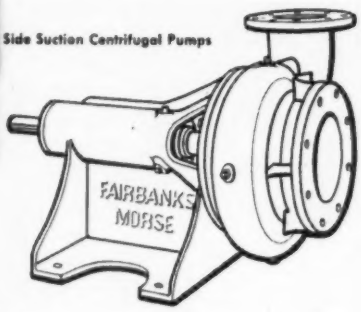


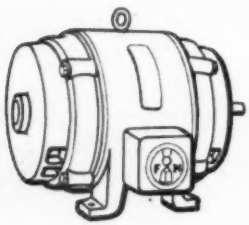
ZC Engines



Westco Pumps

Side Suction Centrifugal Pumps



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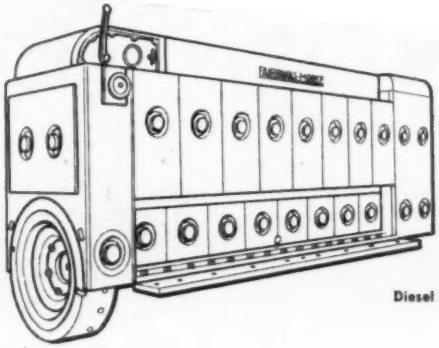
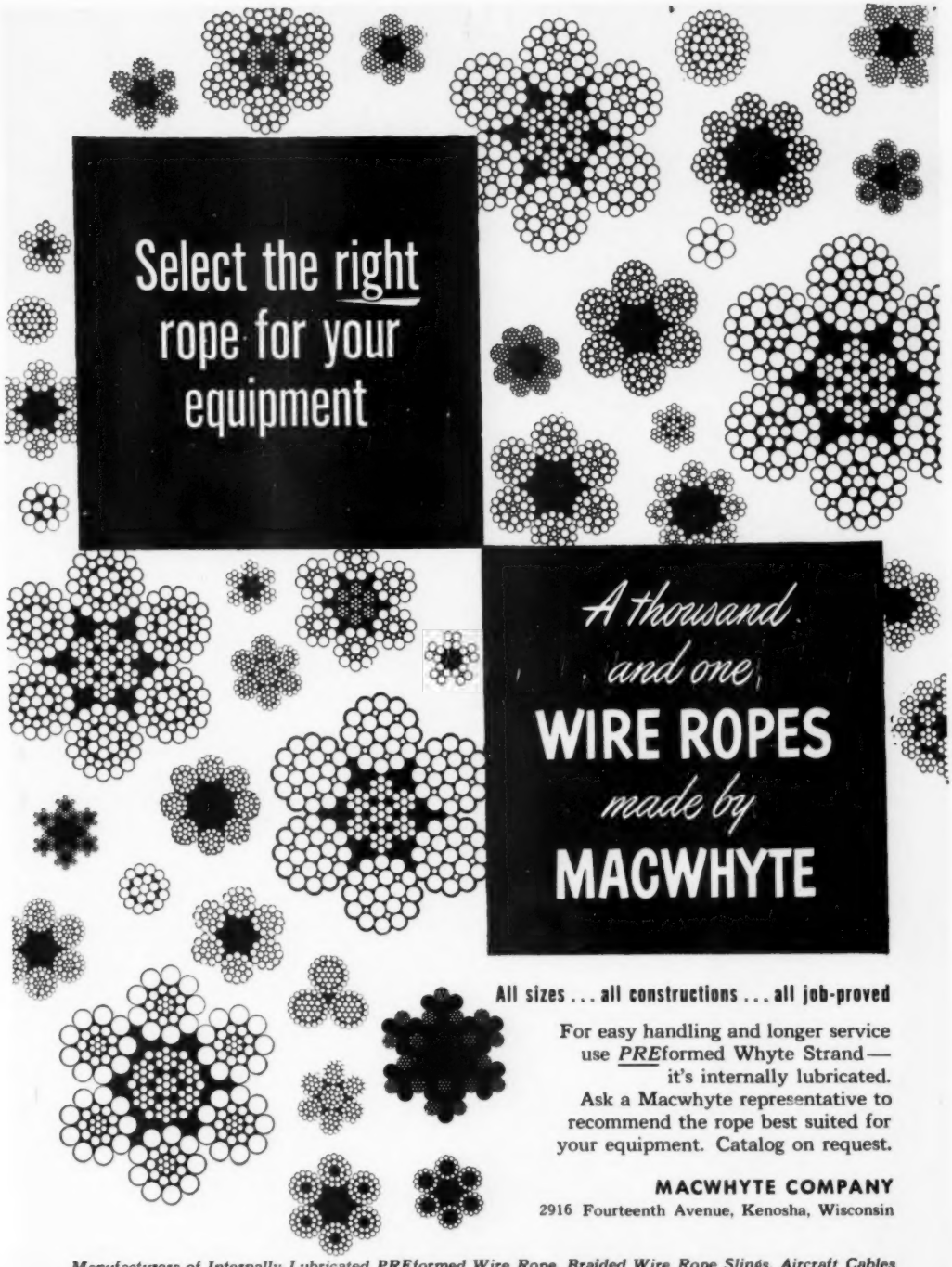


Diesel Engines

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For easy handling and longer service use *PRE*formed Whyte Strand—it's internally lubricated. Ask a Macwhyte representative to recommend the rope best suited for your equipment. Catalog on request.

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278

# NEW AMERICAN IRON TYPE GM CONTROL HEAD PACKER WITH DOVETAIL SLIPS

- Specially engineered dovetail slips and guides!
- Patented lateral expanding cup assembly (sealing element)!
- All the seal is accomplished in one sealing element!
- Patented simple-setting arrangement!
- Full tubing size opening through length of packer!
- Smooth running because of ample fluid by-pass area!
- Choice of large, carefully heat-treated friction springs or friction block assembly!

Patent Pending

## FOR DEEP HOLES . . . HIGH PRESSURES

This Type GM American Iron Control Head Packer has ALL the field-tested features of our popular Type G Control Head Packer PLUS such additional features as Dovetail Slips! It is available with friction block assembly instead of friction springs, if desired. In every way, this packer is engineered for extra heavy-duty performance requirements encountered in areas where extremely difficult conditions exist. Just like our Type G Packer, this Type GM Packer seals without crushing the cup because the super cup assembly is expanded laterally—not compressed! And the complete seal is accomplished with this one sealing element which results in a large, perfectly sealed area that withstands highest pressures encountered.

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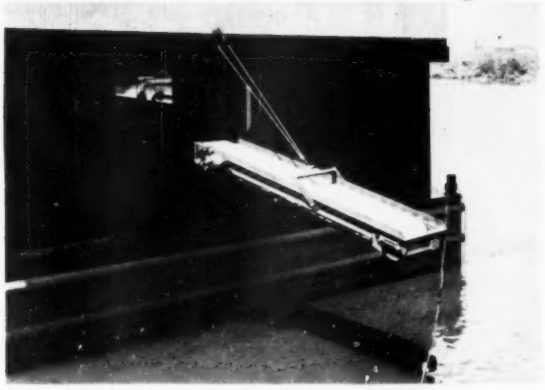
AMERICAN IRON & MACHINE WORKS CO. A OKLAHOMA CITY U.S.A.

**REMEMBER, THERE IS AN AMERICAN IRON SERVICE MAN IN EVERY ACTIVE FIELD**

# *Off-Shore Drilling has* Special Problems...

## LINK-BELT *helps with the* Answers.



The C. G. Glasscock Drilling Company, of Corpus Christi, Texas, is out to lick the special problems that come up in barge drilling. Link-Belt provided two pieces of specialized equipment as answers: (1) a mud conveyor; and (2) an oil-tight rotary chain casing.

The conveyor is used for moving bags of mud and cement from the supply boat to the drilling barge. Built in Link-Belt's Houston plant, and using Link-Belt Precision Steel Roller Chain, sprockets, bearings, idlers, conveyor pulleys, and enclosed gear drive, this conveyor "delivers the goods" faster, safer, at less cost, and *with less maintenance*.

The oil-tight rotary chain casing (housing L-B Precision Steel Roller Chain) on this heavy duty rig keeps the oil inside . . . dirt and sea water outside . . . reducing wear and eliminating corrosion. In addition to increasing safety, this chain casing provides an oil bath for the roller chain, assuring proper lubrication. This is another example of how L-B helps provide *better service longer, with less maintenance*.

L-B engineers will be glad to help you with your conveyor or power transmission problems. There's no obligation.

**LINK-BELT COMPANY**

Indianapolis 6, Dallas 1, Houston 1, Kansas City 6, Mo., Los Angeles 33, New York 7, Toronto 8. Offices in Principal Cities.

11,700

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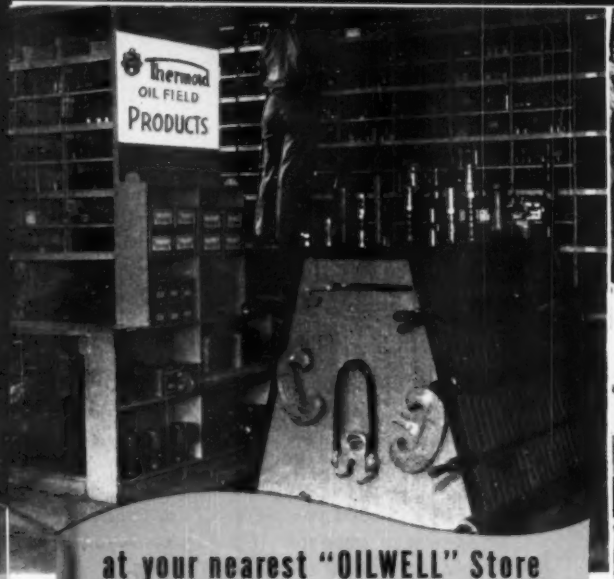


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# Thermoid Products
## for the Drilling Industry

PATENTED and exclusive methods of construction give extraordinary strength, lasting toughness and extreme flexibility to the Thermoid Powerflex Rotary Hose.

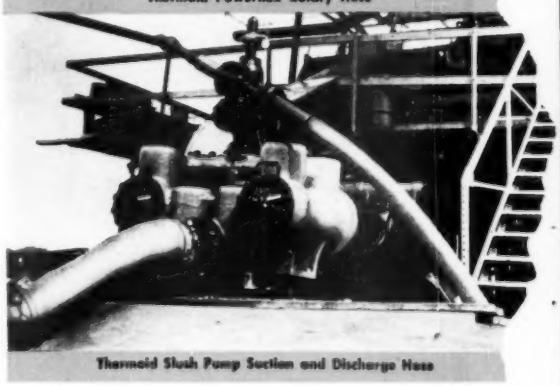
Thermoid's supervision and quality control plus proven design have produced a flexible, oil-resistant, synthetic rubber-and-fabric, steel-reinforced rotary hose which meets A.P.I. specifications 100%. It is designed to withstand the punishment inflicted by pulsation. Its long service makes it the most economical buy per foot of hole.

Other items in the Thermoid line are the Slush Pump Suction Hose and Discharge Hose Units—recommended for equally severe service, with drilling fluids containing sand, grit and other abrasive materials. The giant wire in the Suction Hose is floated in a double cushion of live rubber, assuring extreme flexibility required for pump pulsations. Discharge Hose Units are built to the same specifications as Thermoid Powerflex Rotary Hose.

**The Thermoid Line Includes:**

**ROTARY HOSE · SLUSH PUMP SUCTION HOSE · FLEXIBLE DISCHARGE UNIT HOSE · PRODUCTION AND REFINERY HOSE OF ALL TYPES V-BELTS AND DRIVES · OIL COUNTRY BELTING · STUFFING BOX RINGS · WOVEN OIL FIELD BRAKE LINING**

Thermoid Powerflex Rotary Hose



Thermoid Slush Pump Suction and Discharge Hose

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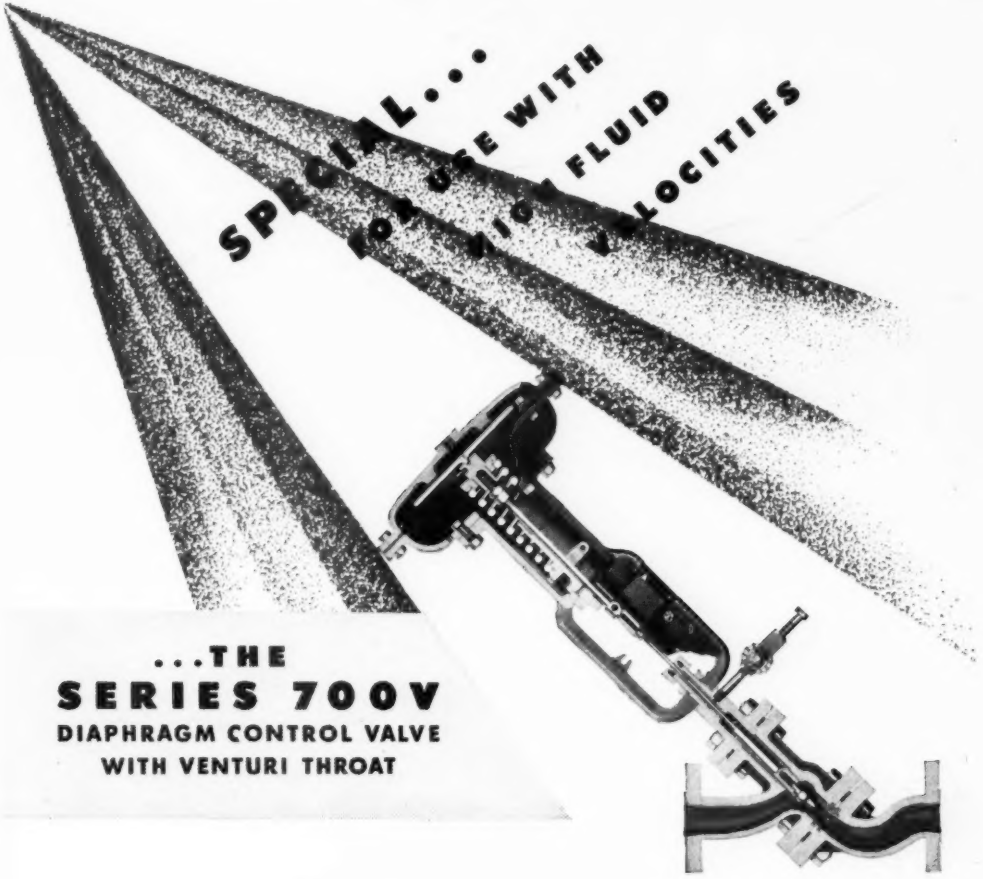


# ...THE SERIES 700V

## DIAPHRAGM CONTROL VALVE WITH VENTURI THROAT

HIGH fluid velocities . . . even viscous fluids and fluids containing suspensions . . . are pushovers for the Series 700V. A special venturi throat eliminates the sudden change in direction of flow so often the cause of trouble under such conditions. As a result, in-service time is unusually high.

**OUTSTANDING FEATURES OF THE 700V**

- *Special flushing connection to keep stem operation free.*
- *Special materials for body and trim to meet prevailing operating conditions.*
- *Special design, renewable disc and seat ring.*
- *Special provision for field conversion from straight through to angle operation.*

You'll save a lot in maintenance costs alone, if you standardize on the Series 700V for high fluid velocities. Call in your local Honeywell engineer for complete information . . . he is as near as your phone!

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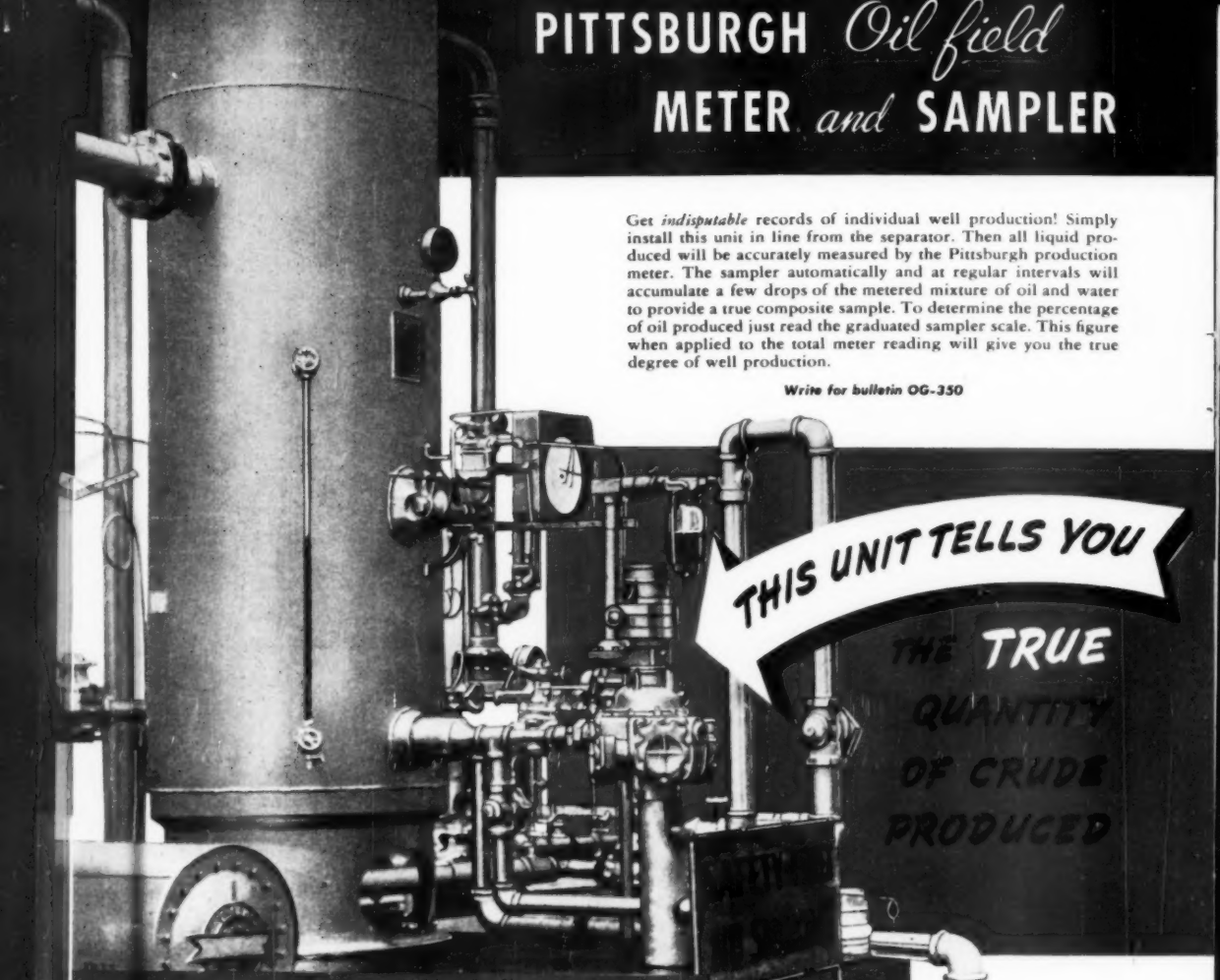
AND PROCESS CONTROL SPECIALTIES

# PITTSBURGH *Oil field* METER *and* SAMPLER

Get *indisputable* records of individual well production! Simply install this unit in line from the separator. Then all liquid produced will be accurately measured by the Pittsburgh production meter. The sampler automatically and at regular intervals will accumulate a few drops of the metered mixture of oil and water to provide a true composite sample. To determine the percentage of oil produced just read the graduated sampler scale. This figure when applied to the total meter reading will give you the true degree of well production.

***Write for bulletin OG-350***




## HERE'S ALL YOU DO...

### READ THE QUANTITY

A straight reading register on the meter records the total production of the well in barrels.

### SEE THE QUALITY

A graduated scale beside the sampler jar tells at a glance the percentage of oil produced by the well.

### KNOW TRUE PRODUCTION

Just apply the oil percentage correction figure to the total of the meter reading and you instantly know the exact quantity of crude produced over any period of time.

Pittsburgh Oil Field Meter and Sampler installation in the Esperson Dome field near Dayton, Texas. Unit has been in continuous operation for nearly 2 years.

## PITTSBURGH EQUITABLE METER DIVISION
## ROCKWELL MANUFACTURING COMPANY

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# Out Ahead Again FOR 1950!

## New "Weight-Saving" Diesel Tractors • New Middle-Weight Six-Wheelers
## New Power and New Features in Light and Medium Duty Models

Once again GMC leads the truck transport parade . . . once again GMC introduces improvements in design and function . . . once again GMC widens the scope of truck performance and truck usefulness.

For 1950 there's a new heavy duty 2½-ton "470" series . . . two new "400" and "620" series six-wheelers . . . two new "weight-saving" Diesel-powered tractors built to handle maximum legal payloads in the 45,000-55,000 pound weight range . . . a new 1½-ton "280" series of 11,000 pounds GVW.

These new models combine to offer GMC power, dependability and economy to many more operators . . . and all along the line GMC's move even further out in front. New camshafts, valves and manifolds step up the power in light-medium models. Wider seats, more headroom and improved sealing increase their cab comfort. And there are new chassis features, including new hydraulic and optional air brakes on 2½-ton models, new front springs with airplane-type shock absorbers on light trucks. Your nearest GMC dealer has complete facts. See him soon.

**Construction contractors, oil field operators and movers of earth and rock will find a model ideally suited to their hauling needs in the GMC line which ranges from 4,600 pounds GVW to more than 90,000 pounds GCW. The two new six-wheelers, for example, with 24,000 and 32,000 pound GVW ratings are particularly well adapted to construction, oil field and quarry transport jobs.**

GMC
GASOLINE • DIESEL
TRUCKS

GMC TRUCK & COACH DIVISION • GENERAL MOTORS CORPORATION

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# we take your order

# ...fill it

# ...and ship it

# *quicker*

as we fill your order from well balanced stocks maintained in each of our stores, and as each of our store managers has the authority to operate as an individual store.

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FOR DEPENDABLE SERVICE CALL THE NORVELL-WILDER MAN

SAVES YOU VALUABLE TIME ON ALL ORDERS AND FORESTALLS TROUBLE IN AN EMERGENCY

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# GASO PUMPS

## In tune with the times

*In a Period of Stepped-Up Efficiency They Lower Pumping Costs*

The demand of management for stepped-up efficiency as an antidote to inflated taxes and high costs leads logically to GASO PUMPS. Here is why: Gaso has concentrated on oil industry needs for more than 33 years. Gaso makes models to fit your conditions exactly. Gaso engineering keeps abreast of every development that adds to performance. Gaso follows through with immediate parts service covering every standard model in operation. It is performance and performance alone that makes GASO PUMPS the standard equipment of so many companies. Write for catalog.

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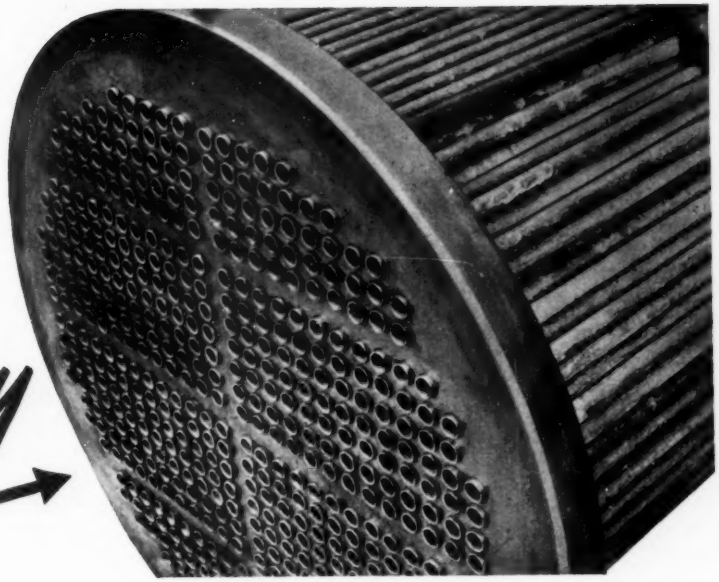
*For economy here →*



# MONEL-CLAD STEEL TUBE SHEETS CAN BE RE-USED

The Monel® cladding guards against corrosion.

The steel base permits *re-rolling*...no need to scrap Monel-Clad tube sheets when re-tubing.

You get *solid metal* advantages with clad steel economy.

Where circulated liquid is brine or otherwise corrosive, Monel-Clad tube sheets can be expected to give exceptional service... even when other metals have proved unsatisfactory.

Because of its high corrosion-resistance and its long life economy, Monel-Clad Steel has found wide acceptance in the petroleum and chemical industries where adverse conditions are a threat to operating equipment.

Lukens Monel-Clad Steel for tube sheets meets the standards of the Tubular Exchanger Manufacturers Association. A uniform, ⅜ in. thickness of Monel is permanently bonded to ASTM A-212 Grade B backing. Cladding of this thickness will accommodate the pass partition grooves and first hole tube groove.

For your convenience, Lukens Monel-Clad Steel for tube sheets is stocked in ready-to-use standard plates. Thicknesses now available range from 2 in. to 4 in., in ½ in. increments.

For further information and prices on Lukens Monel-Clad Steel, write directly to the Lukens Steel Company, 524 Lukens Building, Coatesville, Penn.

And for the tough jobs, Monel condenser tubing is available from stock in ¾" diameter and wall thicknesses of 14 and 16 gauge. For sources of supply, write directly to Inco.

**THE INTERNATIONAL NICKEL COMPANY, INC.**

***67 Wall Street, New York 5, N. Y.***

**MONEL... for minimum maintenance**

EMBLEM OF SERVICE INCO

## In Refineries, FLEXIBILITY COUNTS

# GET POWER WITH

*In oil refineries, where modernization programs frequently require shifting of equipment from place to place within the plant, drives with flexibility of application are a "must". This is one more reason why General Electric's STANDARD line of mechanical-drive turbines is winning such popularity in the petroleum industry. They can be easily transferred from one job to another, their speed and range changed easily, and their horsepower rating adjusted economically.*

## DP TURBINES PROVIDE FLEXIBILITY THREE WAYS

1. EASY TO RE-LOCATE

Shaft height is the same on all G-E standard single-stage turbines. This means that moving turbines from one job to another doesn't require a "custom line-up job." Not only shaft height, but size of coupling fit and keyways are standard on every unit.

DP turbines are quickly aligned, too. Unless casing temperatures are high, DP's can be lined up cold with the assurance that shaft lift will be within allowable limits when the turbines are heated. Such easy alignment is possible only on a center-line supported unit.

2. EASY TO ADJUST SPEED

By adjusting a simple handwheel, the speed setting can be varied within a 30% range. Once adjusted, the DP's hydraulic governor holds speed accurately.

If a change in application makes a new speed range necessary, the range can be set anywhere from 800 to 5000 rpm by simply substituting a new emergency governor and a new set of low-cost gears on the governor drive. These gears are standard, available on immediate delivery from the factory.

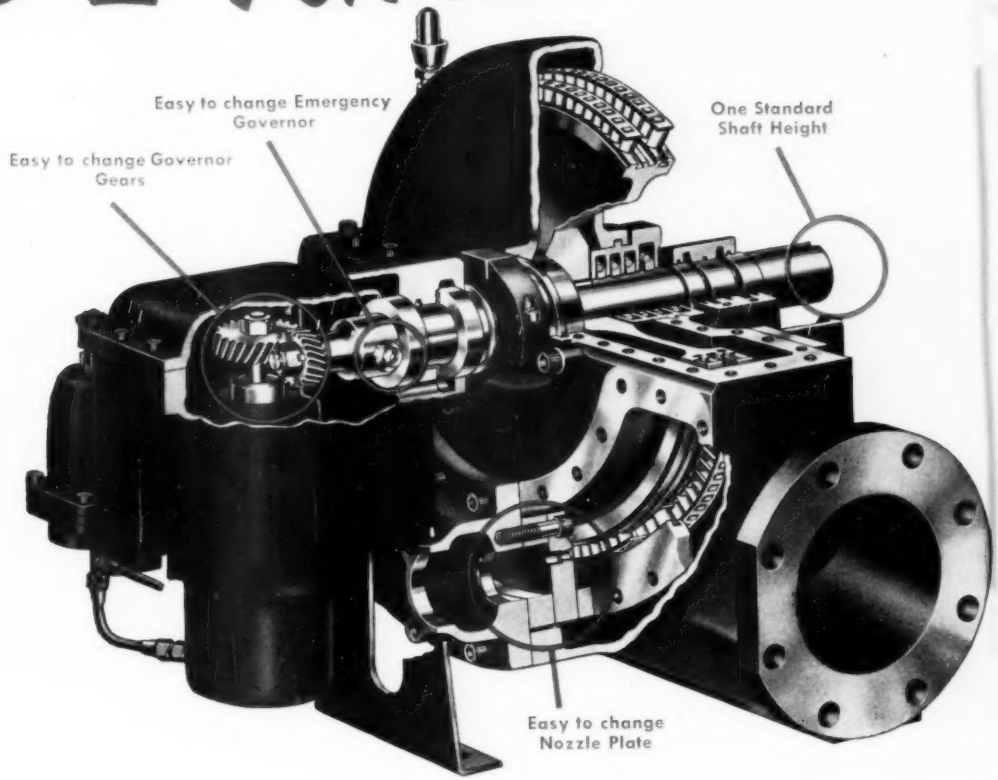
3. EASY TO CHANGE RATING

When steam conditions or load demands change, a DP turbine can be adapted at a reasonable cost for the new requirements if they are within the steam flow capacity of the casing. Example: If it is desired to increase the horsepower rating, the only changes which are usually necessary are new nozzle plate and valve parts. The cost of such parts is far less than the cost of a new turbine—which would be required with a less flexible unit.

## REMEMBER...

**"DP means Dependable Power"**

# FLEXIBILITY G-E TURBINES



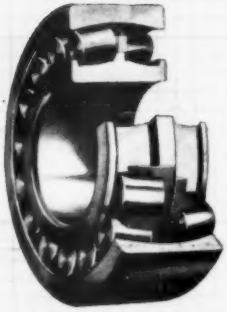

The General Electric standard DP Turbine incorporates many outstanding features previously found only on "special" turbines. They give you a drive which is dependable and flexible—ideal for application in the oil industry.

For the full story on how these features can mean operating benefits for you, call your G-E representative. Or write today for GEA-4955, a 20-page, descriptive bulletin. Apparatus Dept., General Electric Co., Schenectady 5, N. Y.

GENERAL ELECTRIC

## keeping a whip hand over the drill string...

# TORRINGTON BEARINGS



It takes rugged equipment to control a mile and a half of drill pipe lashing around at high speed.

To handle heavy loads in rotary tables, The Brewster Company specifies Torrington Angular Contact Ball Bearings. They carry not only the thrust load but also the radial load imposed by the driving gear and unbalanced weight.

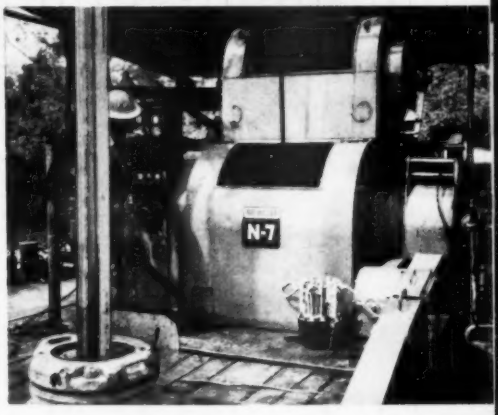
In the drawworks, where shafts are subject to deflection, Torrington Spherical Roller Bearings are used to insure smooth operation and long life.

These are typical examples of Torrington's ability to solve all kinds of friction problems. This experience with all major types of anti-friction bearings can be helpful in making your equipment give more dependable service. Why not consult our engineers on your next bearing application?

**THE TORRINGTON COMPANY**

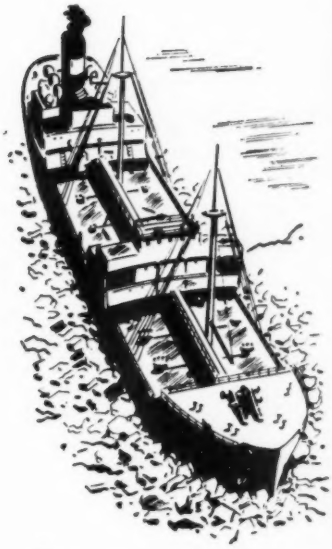
South Bend 21, Ind. • Torrington, Conn.

District Offices and Distributors in Principal Cities of United States and Canada

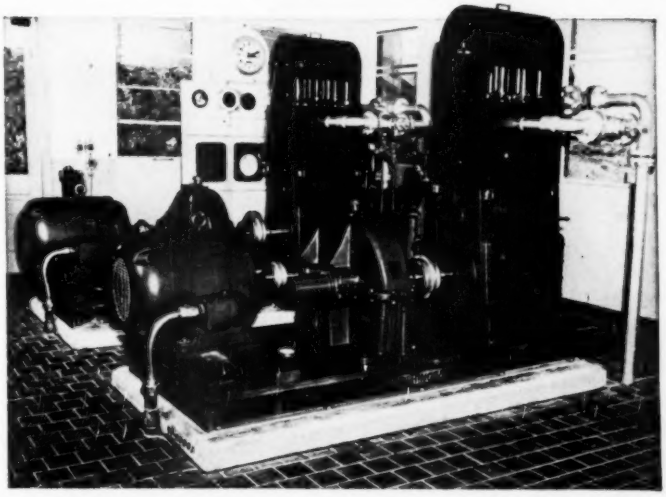



**TORRINGTON** *SPHERICAL ROLLER* **BEARINGS**

SPHERICAL ROLLER • TAPERED ROLLER • STRAIGHT ROLLER • NEEDLE • BALL • NEEDLE ROLLERS



# When the tankers can't deliver... these pumps can!



In the Socony Vacuum Pumping Station at South Portland, Maine . . . The Worthington Variflo-VTE Pump combination that provides complete capacity-control for handling a variety of petroleum liquids.

During severe cold spells the harbor of Bangor, Maine often becomes frozen over, completely halting tanker service and complicating the task of keeping the state's second largest city supplied with gasoline, fuel oil and other much needed petroleum products.

To meet this situation, the Socony Vacuum Oil Company has set up a pumping station at South Portland, 100 miles to the south. From here, a constant flow of vital petroleum commodities is delivered to Bangor, regardless of weather.

### Where "Flexibility" Counts

In product-pipeline service involving liquids of different viscosities, the variation of friction in the pipeline requires a variable capacity. That's why the "heart" of the Socony Vacuum station consists of two Worthington Vertical Triplex Power Pumps — a variable stroke Variflo operating in parallel with a constant stroke VTE.

This extremely flexible combination is featured by the Variflo's ability to vary its capacity, automatically and continuously, to maintain maximum allowable flow for any given liquid — as determined by the selected pressure at the governing point, and regardless of temperature and viscosity variations. Also, the Variflo-VTE hookup cuts power costs to a minimum and, being essentially self-governing, needs only periodic attention from an operator.

Worthington Variflo and VTE Power Pumps are built in all sizes up to 150 hp. For bulletins with facts proving *there's more worth in Worthington*, write to *Worthington Pump and Machinery Corporation, Reciprocating Pump Division, Harrison, N. J.*

**WORTHINGTON**

P-9-1

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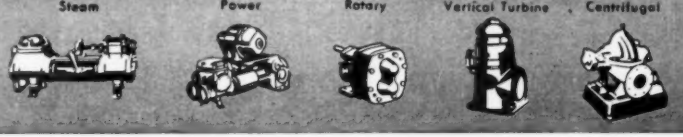


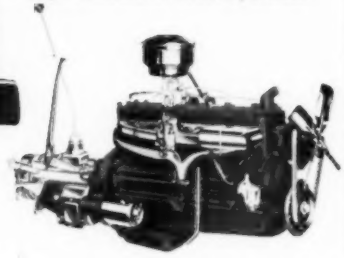
# NOW! The most powerful 6-cylinder Ford Truck ever built!

*New* ROUGE **254** SIX

## ENGINE

### FOR THE HEAVY DUTY F-6

**Thoroughly Proved in Industrial Engine and Motor Coach Operation**



In Ford Series F-6—110 Horsepower, 212 lbs.-ft. Torque
In Ford Series F-6 COE—106 Horsepower, 210 lbs.-ft. Torque

**New Ford 110-H.P. engine plus new 4-speed Synchro-Silent transmission make Series F-6 the standout performer in its class!**

THE BRAND NEW Rouge 254 Truck Six gives you new power, new performance in the heavy-duty field.

This 254 cu. in. powerhouse gives you the latest engineering ideas. Free-turn, self-cleaning exhaust valves, faced with durable cobalt-chrome alloy. High-lift camshaft for increased valve opening. Chrome-plated top piston ring for longer cylinder wall life.

You get these and many other new features in the new "Rouge 254" available in Ford Model F-6. You get power that makes the F-6 the most powerful 6-cylinder Ford Truck ever built. You get the brand new 4-speed Synchro-Silent transmission. You get Bonus* Built construction which means big reserves of strength and power. See your Ford Dealer. Get all the facts about the new "Rouge 254," the fourth in a great line of Ford Truck engines.

*BONUS: *"Something given in addition to what is usual or strictly due"—Webster*

**THE NEW FORD 254 ENGINE gives you all these modern design features!**

CHROME-PLATED top piston ring for better lubrication, longer cylinder life.

AUTOTHERMIC aluminum alloy pistons with solid skirt. Steel strut controls piston to wall clearance.

HIGH-LIFT camshaft for increased valve opening, greater power.

FREE-TURN exhaust valves. Self-cleaning, better seating, longer-lived.

COBALT-CHROME faced exhaust valves for hard contact surface giving longer wear.

HIGH-TURBULENCE Power Dome combustion chambers for more power, greater economy.

## Ford Trucks Cost Less because

# FORD TRUCKS LAST LONGER

***Using latest registration data on 6,106,000 trucks, life insurance experts prove Ford Trucks last longer!***

# They Say—

### Tax Cloud

"Never before have we enjoyed such a year of road-building activity and expenditure, and it is confidently expected in all quarters that these records will be shattered again in 1950.

"This otherwise heartening atmosphere is beclouded by the fact that the annual burden of state and federal gasoline and automotive taxes now is running alarmingly close to $100 per vehicle, and the gasoline tax nationally averages about 33 per cent of the retail price of this product."

*Baird H. Markham, director of the American Petroleum Industries Committee of the A.P.I.*

### Old Faithful

"Believed to be one of the oldest oil wells in years of continuous production in Ohio, if not the entire Midwest, is a well at Ironville, within a couple of miles of Sohio's Toledo refinery.

"Known as 'Old Klondike,' the well was blown in as a gusher on July 27, 1897, with a 16,000-bbl. a month production. It flowed day and night for 8 years. Now 2 days' pumping a week catches all the production, which although small, remains remarkably steady, with no symptoms of weakening.

"Figures show that on five successive monthly pickups from the well, gallonage ran from a low of 2,794 to a high of 2,874—an average of about 68 bbl. per month after 50 years of production. In addition, the well has enough gas for its own operation and turns a 60-hp. engine attached to its pump."

*The Sohioan, Standard Oil Co. of Ohio.*

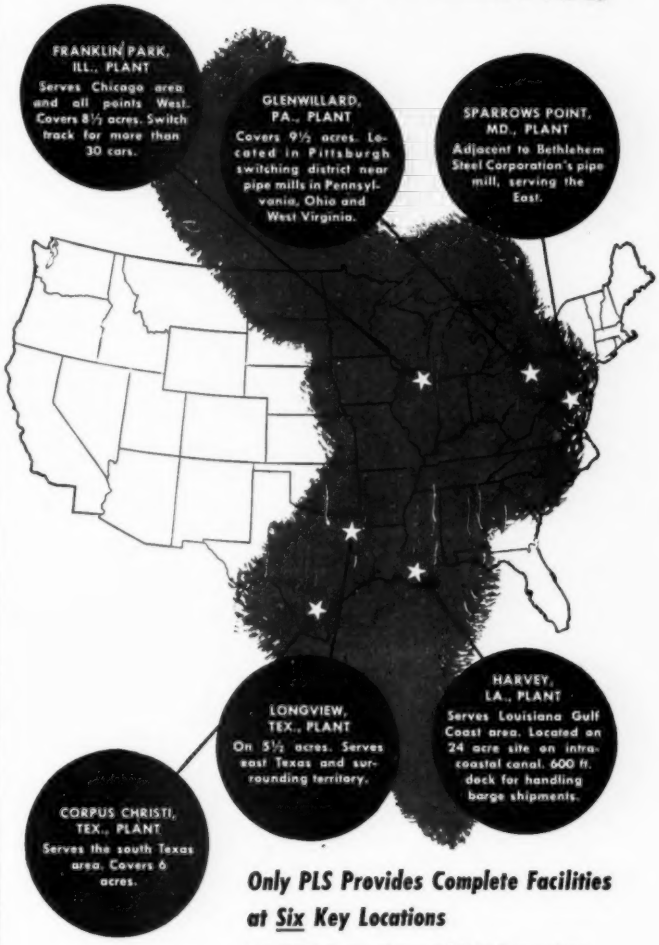
### Oil an Exception

"An exception to the otherwise satisfactory picture given me on conditions in Texas and Oklahoma concerned a falling off in domestic crude oil production and in employment in that and related fields. A number of independent oil producers, representatives of firms doing drilling or selling supplies and equipment in the oil fields, as well as union officials, ascribed the situation to the high level of crude oil imports by American firms, particularly from the Near East.

"It was their view that with present imports, independent producers could not find the volume of business which would permit them to finance vigorous exploratory and development activity.

"Those expressing these views


YOUR GUIDE TO BETTER PIPE PROTECTION SERVICE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Serves Chicago area and all points West. Covers 8½ acres. Switch track for more than 30 cars.
GLENWILLARD, PA., PLANT
Covers 9½ acres. Located in Pittsburgh switching district near pipe mills in Pennsylvania, Ohio and West Virginia.
SPARROWS POINT, MD., PLANT
Adjacent to Bethlehem Steel Corporation's pipe mill, serving the East.
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Serves Louisiana Gulf Coast area. Located on 24 acre site on intracoastal canal. 600 ft. deck for handling barge shipments.
LONGVIEW, TEX., PLANT
On 5½ acres. Serves east Texas and surrounding territory.
CORPUS CHRISTI, TEX., PLANT
Serves the south Texas area. Covers 6 acres.

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Pipe Line Service has established complete pipe protection facilities in six locations to meet the varying requirements of pipe users, provide storage space and effect every possible economy for customers. You can send your pipe to any one of these plants with full assurance that it offers you the finest pipe protection your money can buy.

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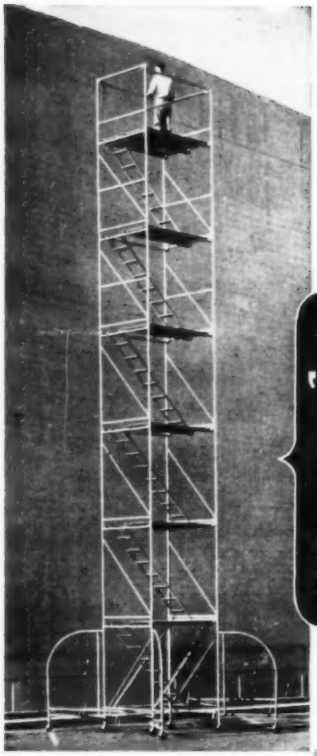

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*Reports Superintendent G—*

WITH *Revolutionary* NEW

Aluminum Alloy

"UP-RIGHT" SCAFFOLDS

and

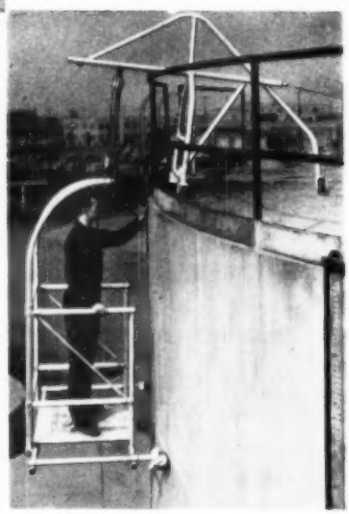
ROLL-AROUND SAFETY CAGE

**Mobile 45' unit takes only 15 minutes to erect!**

Scores of petroleum industry users report big labor savings on tank painting, inspection, control, gaging and general overhead maintenance with Up-Right Scaffolds and Roll-Around Safety Cage.

Scaffolds are available in desired number of 6-foot and shorter section units for rapid, easy assembly. Roll easily from position to position throughout job. Stronger than structural steel yet one third the weight. Safety tread stairway completely within structure. No wrenches, wing nuts, bolts, loose parts. Each section folds flat.

Roll-Around Safety Cage, anchored to eye-bolt on top of tank, provides a new, faster method for covering entire wall areas of tanks. Weighs only 70 lbs., and its unique design permits the use of pole guns and bulky maintenance equipment. Unusual safety features include widely spaced legs which eliminate wind hazards. ➔



*Write for detailed information*

**UP-RIGHT SCAFFOLDS**

**Dept. 130 • 1013 Pardee Street • Berkeley, Calif.**

**Factories: Berkeley, Calif., and Teterboro, N. J. Offices in all Principal Cities.**


seemed generally to favor some reduction in crude oil imports, though there was no uniform suggestions made as to the specific level which should be permitted. Finally, a part of the decline was accounted for by the lower production allowances permitted under state legislation during 1949, and by reduction in offshore exploration and development work pending settlement of the matter of ownership of tidelands oil."

*Charles Sawyer, secretary of commerce, as quoted by the Associated Press.*

### Shipping Revolution

"In marine transportation, dramatic interest has attached in recent years to the switch to petroleum as the source of power. The development of the diesel engine has had a great deal to do with this, and today 99 per cent of all United States ships are oil-burning, where only 4 per cent used petroleum fuels in 1913. . . .

"There is an odd note to all this, for back in 1846 more than 700 American ships were employed as whalers, and New Bedford ranked as the greatest whaling port in the world. Profits were extraordinary. It is recorded that one ship costing $40,000 brought home a cargo of whale oil, sperm oil, and whalebone, valued at $89,000. The Montreal, out of New Bedford, did even better—$136,000.

"Drake's pioneer well in 1859, providing a new source of illuminants, sounded the death-knell of the whaling industry. It was a severe blow to American shipbuilding, and doubtless there were many who felt that it we lost our ambitious bid for world shipbuilding supremacy, petroleum would in large measure have been a chief cause of the disaster.

"He would have been a seer laughed at from the streets who would have dared then to prophesy that petroleum would some day power and lubriate almost every ship we sent to sea, and most of those would meet in every quarter of the globe!"

*Service, Cities Service Co.*

### Gas-Price Variations

"The association, having just completed a successful legislative fight to standardize the measurement of gas in Texas and to correct the inequities which existed in the measurement of gas, might well begin consideration of the most glaring injustice in the production of gas at this time. This inequity is the wide variation in the price of both natural and casing-head gas from district to district, county to county, field to field, and even from one lease to another in the same field.

"From figures obtained from the reports of the gas producers to the state comptroller, the county average price of sweet gas in January 1949 varied from a low of 1½ cents per M.c.f. in Kleberg County to a high of

15 cents in Calhoun County. Casinghead gas from the same records in January of this year varied from a low of 1.19 cents in Marion County to 1.3 cents in Henderson County to a high of 24 cents in Upshur County and 20 cents in Rusk County.

*The TIPRO Reporter, Texas Independent Producers and Royalty Owners Association.*

### Slip Covers for Derricks

"Gigantic 'slip covers' for derricks which are soundproof, waterproof, and fireproof are proving helpful in the drilling of oil wells in restricted areas where noise and mud spray cannot be tolerated. The derrick coverings muffle 90 per cent of the normal rig noises and, in addition, provide an extra safety margin from the dangers of fire and oil or mud splatterings. Constructed of multilayer fabric materials, the covers can be installed or removed easily and, with proper care, can be used many times.

"Besides the sound, water and fire protection, the covers hold great promise of being adaptable to drilling conditions during the cold winter months in Rocky Mountain regions and other areas where some protection against the elements is desired. The insulation factor of the covers ranks higher than cork or ordinary lumber. The soundproofing alone has made possible the drilling of some oil wells in southern California which otherwise would not have been permitted."

*Petroleum Newsnotes, Department of Information, American Petroleum Institute.*

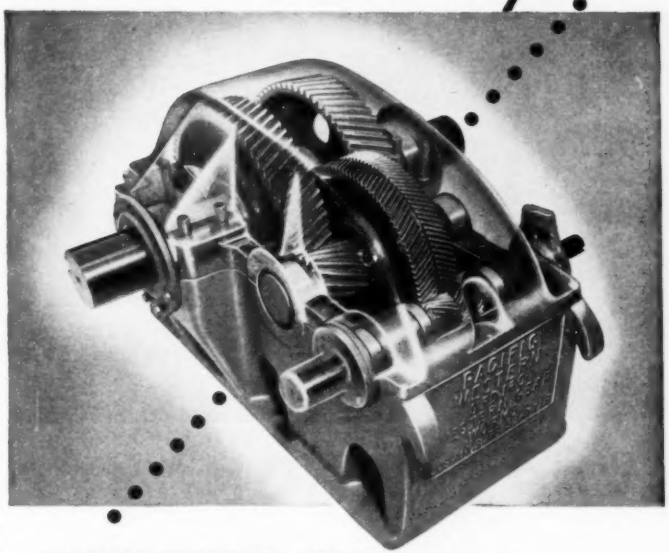
### British Restrictions

"If they lose a considerable part of their market in the United Kingdom, the American companies will naturally attempt to increase their sales elsewhere. One good way to attract new customers is to quote them attractive prices. It is imaginable, to put it mildly, that the American refiners might thus take from the British companies a portion of their present markets—those on the continent of Europe, for example.

"They would be within their rights in doing so. One of the world's great needs today—we persist in believing—is a wider competitive play of free markets. But an oil price war, once started, could go far. The smaller oil producers in this country, the so-called independents who do not refine, are already incensed over a small but apparently developing excess of imports into the United States over the country's exports. Might not oil produced in the Near East and Venezuela by companies of American ownership slop over here if it were excluded from its developed market in Europe?"

*Editorial in the Wall Street Journal.*


ONLY AS GOOD AS THE *Gears!*



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***Fast Delivery on Many Popular Sizes of Oilfield-Type Speed Reducers from Stock***

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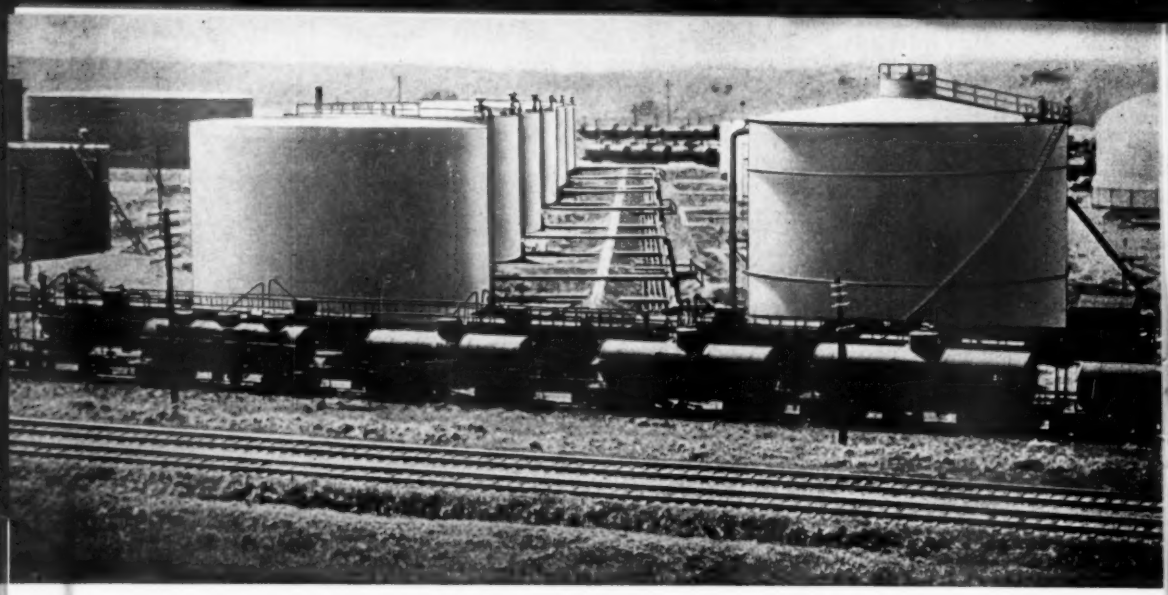

# EVAPORATION THE ENEMY OF CONSERVATION

The Wiggins Dry Seal Gasholder shown above at the right, interconnected to six storage tanks is enabling a prominent oil company to turn vapor losses into profits. Today — more than ever before — this is both a patriotic and economic necessity.

A new booklet "Wiggins Vapor Balancing Systems" is now available. It describes and illustrates many exclusive Wiggins design and construction features of both the Wiggins Lifter Roof and the Wiggins Dry Seal Gasholder.

**WIGGINS CONSERVATION STRUCTURES**

- Hidek Floating Roofs
- Lodek Floating Roofs
- Balloon Roofs
- Breather Roofs
- Dry Seal Lifter Roofs
- Dry Seal Gasholders

Charts of various types of evaporation losses, a graph and "Pay-Out Analysis" table should prove valuable to every executive and engineer responsible for the efficient storage of products subject to evaporation losses. Write for a personal copy today.

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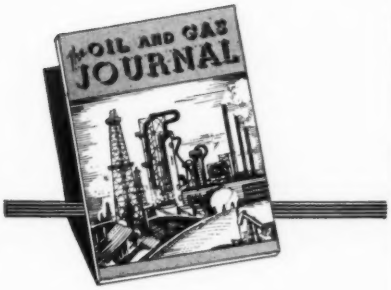


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# JOURNALLY Speaking

## Ellick Botts Writes

THE department is honored to receive a letter from Ellick Botts, Consulting Pumper, Grey Horse 1, Okla., well known in oil circles as a doodlebug expert of sorts and commentator on national affairs.

Mr. Botts referred to a recent reference here to the German poet and geologist, Goethe, only he is a bit confused. Actually, Mr. Goethe didn't help us color some maps; we just stole the idea from him, 200 years later, and are selling it for 50 cents (adv.).

The real purpose of Mr. Botts' letter is to ask us to get in a plug for the science of wiggle-sticking. This we are reluctant to do because it might result in the discovery of an embarrassing surplus of oil. However, we are not in position to dispute Mr. Botts' contention that the birth of his profession antedates our friend Goethe by a couple of hundred years. So we will pass on his letter as a contribution to the industry's historical literature:

"I see that you have located 'one of the first geologists' in the person of Goethe and, by the way, I wish you had supplied a pronunciation of his name. Some of my neoclassical friends call him 'Gerty,' which I do not like. There was a play years ago called 'Getting Gertie's Garter,' but, as I recall, neither poetry nor g e o l o g y was mentioned. Others say 'Gathie' and still others give it the green persimmon treatment.

"Before you go ahead and propose your hero for the position of Posthumous President Emeritus of the American Association of Petroleum Geologists, I invite you to broaden your research. Even if he did make up some colored charts of the Hunton lime and the Bird Creek sand, the science that is basic to all is the divining rod, wigglestick, or doodlebug. I hold in my hand as I write this, Mr. Ralph, a copy of Water Supply Paper 416, of the U. S. Geological Survey. The bibliography on the art of water-witching, etc., the foundation of all geophysics, shows that there were publications dealing with the subject as early as 1532.

"My point is that I want your Mr. Goethe put in proper relationship in the great field of science. It is valuable to know that the Farmer's Sand of Michigan is the same as the Suit Case Sand of Texas (that's the one you hit and then start packing to go home), but it is more important to predetermine the grease content of the sands. We doodlebug experts (or 'dowsers' as we are known in England) have been denied our place in history too long. Greatly beloved by the man-in-the-street, we are sneered at by men of less imagination. I am merely asking you, Mr. Ralph, not to be carried away by a temporary infatuation. I have always looked upon you as prime doodlebug material and I hate to see you take a wrong road just because a poet happened to come by The Oil and Gas Journal office one time and helped color some maps."

## Storm Signals

THE seafaring tradition behind Sun Shipbuilding & Dry Dock Co., tanker-building affiliate of Sun Oil Co., has blossomed into a weather service which helps employes navigate h o m e w a r d through Philadelphia's winter smog, sleet, and traffic. Every evening as the workers pile into their cars, loudspeakers blare bulletins, compiled by the local American Automobile Association, telling of weather reports, traffic jams, road blocks, and other driving hazards.

That's one idea the Russians can't c l a i m—factory workers there don't own cars.

## Turnabout

THE American Petroleum Institute says that a new technique uses a column of oil to drill steel. That's fair enough. For a long time a column of steel has been used to drill oil.

*—Henry D. Ralph*

# When it's time to perforate . . .

# you'll *save* time with WELEX

Many well operators will tell you that Welex always seems to get on the job faster. And at your well you'll find the Welex crew works with speed and precision that saves you important dollars in rig time.

This efficient, precision service is the result of Welex's extensive experience in JET perforating . . . experience accumulated during years of jet research and development. No other well servicing organization offers you greater efficiency or more certainty of results than Welex . . . . the *originators* of the jet process of casing perforating.

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# A RIG SIDE CHAT

## about Baker Retainer Production Packers

What we want to talk about today is how the Baker Production Packer is set securely in the casing, anchored against either upward or downward movement, with the tubing production string left free from the packer. The tubing is run through the body of the packer for production, and is free to be pulled at any time without disturbing the packer. In the typical application drawing (far right) the packer has been set and anchored to the casing by the two sets of opposing slips, with the Hycar packing unit sealed-off against the casing and retained in position by lead seals.

We want to produce from a zone below the packer so we make up the string with a Baker Perforated Production Tube on bottom (with operator's tubing to provide an additional stinger, if desired); above is a Baker Multi-V Tubing Seal Nipple; next a No Left Turn Latching Sub; and above that comes the tubing. Now we run-in the well until the Latching Sub engages in the top of the packer. The engaged Sub automatically positions the Multi-V Tubing Seal Nipple accurately in the smooth bore of the packer, and with 5 Hycar rings facing up and 5 more facing down, a perfect seal is obtained between the tubing string and the packer bore. Meanwhile, the Perforated Production Tube, as it was run through the bore of the packer, has unseated the Flapper Valve and now holds it in open position.

It's as simple as that, and we are ready to produce through the ⅜-inch holes in the Perforated Production Tube. These holes prevent junk, debris and large pieces of shale from entering and clogging the production string; and the total area of all holes is equal to or greater than the area of the tubing string.

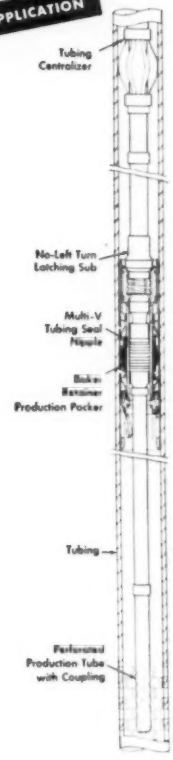
When the tubing string is pulled at some future time, the Flapper Valve in the lower end of the packer body snaps back into the closed position and maintains a fluid-tight seal against upward pressure from below. The packer is not disturbed by pulling the tubing string, but remains packed-off against the casing ready for future operations.

This is only one of the many applications of the Baker Retainer Production Packer for single-zone or multiple-zone production; for selective testing and acidizing; for protection of casing from pressure or from destructive fluids, or gases; and other profitable uses.

Baker Model "D" Retainer Production Packer Product No. 415-D

BAKER TUBING SEAL NIPPLE, MULTI-V TYPE, which effects a fluid-tight seal between the tubing string and the bore of the Packer.

TYPICAL APPLICATION




Single zone hook-up with production string anchored to packer, for: (a) keeping production string in tension to eliminate "tubing breathing" during the pumping cycle; (b) producing by flowing, without imposing excessive weight on packer to hold Tubing Seal Nipple positioned in packer bore; (c) making high pressure injection of gas or fluid for re-pressuring or secondary recovery.

Production string is run-in until No Left Turn Latching Sub rests on top of packer, indicated by drop in weight on strain gauge or weight indicator. The production string is then raised about 5 feet, and the zone washed and brought in, if it will flow.

*If you would like to continue this rig-side chat at any well where you have a production packer problem, call the nearest Baker "Service Engineer." He will have helpful suggestions, and he is as near as your telephone . . .*

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**BAKER OIL TOOLS, INC.** HOUSTON · LOS ANGELES · NEW YORK

**BAKER**

**RETAINER PRODUCTION PACKER**

PRODUCT NO. 415-D

# End the Excise Taxes

WHILE the President's messages to Congress so far have not dealt specifically with sources of revenue, it has been indicated that regardless of the general tax program he will recommend the dropping of some of the hangover excise taxes. This should include the present federal taxes on gasoline, lubricating oils, and pipe-line transportation.

So far as administration policy is concerned, the official expressions of the past week leave no doubt that the nation's economy is confronted with more of what has been going on since 1933. While efforts, as usual, will be made to disguise the fact, this means more, not less, spending; and there will be opposition to the dropping of any existing taxes.

The oil business can't expect general relief from its position as the country's largest taxpayer, but it should be able, along with several other enterprises, to get out from under those special taxes which should have ended 4 years ago. The gasoline-tax situation is particularly important.

This year the revenue from the 1½-cent federal gasoline tax will total about $500,000,000. This amounts to approximately a 15 per cent tax on the refinery gasoline price and in effect is a 7 to 8 per cent sales tax on the retail price. The strong opposition of the public to proposals for a 1 to 3 per cent federal sales tax in recent years indicates what would happen to this gasoline tax if the public generally was aware of its existence.

The federal tax must be added to the state gasoline taxes which have been increased in several states since the close of the war and now average in excess of 5 cents per gallon. The oil industry has never opposed reasonable state gasoline taxes for construction and maintenance of highways.

Tax students are in agreement that the gasoline tax is a proper function of the states and should not be duplicated by counties, cities, or the federal Government. One of the greatest threats of recent years is the tendency of the various units of government to overlap in taxing, ignoring the sound procedure of the past to reserve to each unit that tax which it can most efficiently collect and spend.

There is also a public-relations angle to this federal tax on oil products. Not one customer in a thousand knows that in comparing present prices with those of prewar he should take into consideration the 1½-cent tax. Thus the levy aids in obscuring the fact that based on wholesale indexes, petroleum prices now, as in the past, are far below the general commodity level. Dropping the tax would aid in emphasizing that fact to consumers.

While the oil industry has strong representation at Washington in the perennial threats to the depletion clause and other provisions of the revenue acts, less attention has been paid to excise taxes. Operators were promised that the extra tax burden would end with the close of the war. It is now time to perfect whatever organization is necessary to insist on performance by the law makers.

# THIS WEEK

**NATIONAL AFFAIRS**—Federal budget proposes larger expenditures for most agencies dealing with oil and gas. . . . ¶Two oil investigations proposed during first week of Congress. . . . One demands showdown with Britain on dollar-oil ban. . . . Coal-region congressman wants study of "dangerous shortage of oil." . . . ¶President's demand for higher taxes but adjustment of inequities stirs hope for end of wartime excises on oil. . . . But budget for next year counts on even higher revenues from these taxes. . . .

**SYNTHETICS**—Truman's economic advisers urge new long-range program to develop new fuels and conserve diminishing resources. . . . Declare private industry can't do this because of the great expense involved. . . . ¶Federal budget contemplates no reduction in Bureau of Mines synthetic-fuel program. . . . ¶California operators studying commercial plant to extract petroleum products from Utah tar sands. . . .

**INTERNATIONAL**—Dollar-sterling oil controversy remains deadlocked, with Americans talking retaliation but British firm in their bans on purchases from U. S. companies. . . . British claim Americans improperly excluded sterling oil from Japan. . . . ¶Peru's proposed petroleum law wins favorable response. . . . May result in new concessions. . . . ¶Review of 1949 Venezuelan activities shows that country steadily expanded its oil industry despite declining profits. . . .

**TRENDS**—Total stocks of crude and four major products decreased about 18,000,000 bbl. in the 5-week period ended December 31. . . . Total reduction includes a drop of 1,500,000 bbl. in stocks of foreign crude. . . . ¶Runs of foreign crude averaged 534,000 bbl. daily for last 3 weeks in December, accounting for reduction in stocks of imported crude. . . . ¶Indicated demand for December was lowered by decreased refinery shipments in the last week of the month. . . .

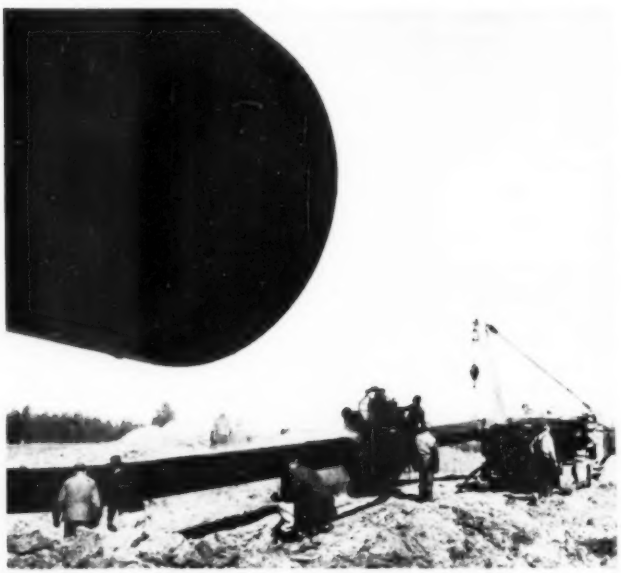
**ACTIVITY**—Crude production for week ended January 7 averaged 4,872,500 bbl. daily, down 63,330 bbl. daily from last week in December. . . . Total completions decreased 11 wells to 714 for week. . . . Wildcats were off 4 wells to 111. . . . Rotary rigs operating in United States continued the seasonal decline with a drop of 85 rigs to 2,034 on January 2. . . . Refinery runs for week ended December 31 averaged 5,626,000 bbl. daily, the highest since January 1949. . . .

**TECHNOLOGY**—S.A.E. meeting continues controversy over value of additives in high-viscosity lubricating oils. . . . Research report defends chemical improvers against earlier charges that they break down under service. . . . ¶Big improvements in motor fuels are forecast by the automotive engineers. . . . Speakers say all theories of detonation may be revised. . . . Higher octane, better antiknock qualities, more efficient fuels demanded. . . .

**SCURRY**—This West Texas county continues the talk of the industry. . . . Latest report shows 180 wells drilling and 40 new locations staked. . . . Big companies are expanding activity here, but most of the 70 operators are independents. . . . Most drilling still on Canyon reef, but some wildcats seek deeper formations off its flanks.

**REFINING**—Socony-Vacuum announces three new 15,000-bbl. cracking units at Buffalo, Brooklyn, and Beaumont refineries will use its new modified Thermofor catalytic process. . . . ¶General Petroleum Corp. switches operation of T.C.C. unit at its Torrance, Calif., plant. . . . ¶Esso Standard Oil Co. cuts water consumption sharply at Bayonne, N. J., plant in line with critical water shortage in that area. . . .

**NATURAL GAS**—Supreme Court upholds jurisdiction of FPC over intrastate pipeline company distributing gas from other states. . . . Decision intensifies campaign for legislation to curb FPC powers. . . . ¶Texas producers becoming interested in legislation to fix minimum field prices for gas. . . . Point to wide regional variance in present prices. . . . ¶Southern Natural Gas Co. seeks FPC authorization to increase its natural-gas facilities in Alabama, Georgia, Louisiana, and Mississippi. . . . ¶FPC denies motion of several New York gas firms to speed up procedure on requests to construct gas facilities. . . . ¶Delhi Oil Corp. prevented from participation in El Paso Natural Gas Co. hearings before FPC.



*INVASION WEAPON.—Like a siege gun pointing at the eastern fuel market is this joint of pipe being laid for Texas Gas Transmission Corp. on its $73,500,000 line between Carthage, Tex., and Middletown, Ohio, one of the several projects through which huge quantities of Southwest natural gas will soon be reaching the Northeast.*

# Budget Review

## Oil taxes, leases to provide $658,000,000; research and regulation to cost many times that, Truman tells Congress

Bertram F. Linz

WASHINGTON.—The federal Government will derive revenues of approximately $658,000,000 from petroleum taxes, leases on public lands, etc., during the fiscal year which begins July 1, but will spend many times that much on petroleum and natural-gal research and regulation, it was disclosed this week in the annual budget sent to Congress by President Truman.

While the budget showed that federal agencies planned to spend $42,439,000,000 during the coming year, the President told Congress he was asking for appropriations and contract authorizations of only $40,500,000,000, which would be some $3,200,000,000 under the estimated expenditures for the current year.

These figures, however, cannot be accepted at face value as they include estimates of expenditures for and receipts from programs which Congress has not approved and will not approve this year, such as the health insurance program.

Another of the many revisions of the budget presentation that have been made in the past 18 years shows the estimates this year by functions rather than specific projects, in many cases making it difficult to trace out just what some funds will be spent for.

**Income from oil.**—In the field of revenues from oil, the Treasury estimates that it will collect $550,000,000 during the 1951 fiscal year from the tax on gasoline as against an anticipated $530,000,000 this year and an actual $503,607,000 in fiscal 1949, which ended last June 30; $83,000,000 from lubricating oils, the same as this year, against $81,759,000 in 1949; and $20,000,000 from pipe-line transportation, again the same as this year, against $19,324,000 in 1949.

The current estimates on 1950 revenues are somewhat different from those of a year ago, the expected revenue from gasoline being revised downward from $536,000,000, $1,000,000 knocked off the pipe line estimate, and $3,000,000 added on lubricating oil.

A revenue of $45,560,000 is estimated from the mineral leasing and other activities on the public lands, against $41,610,000 this year, but no breakdown is provided to show how much of this will be from oil. Last year's budget, however, showed that something over $5,000,000 was to be collected from rentals, oil and gas royalties, and helium.

**Oil and Gas Division.**—The Oil and Gas Division of the Interior Department will be materially strengthened if Congress approves the appropriation of $403,825 provided for it as compared with $347,500 this year, which was all that Congress granted on last year's estimate of $400,000.

The 1951 appropriation would increase the fund for enforcement of the Connally 'Hot Oil' Act from $177,500 to $205,000, which it was explained is necessary to meet growing demand on those states with conservation laws of long standing and to extend operations to Mississippi, which now also has an oil and gas conservation statute, and would raise the fund for other activities of the OGD from $169,500 to $198,825.

**Land Management bureau.**—Expenditures of the Bureau of Land Management for the administration of public lands and mineral resources are estimated at $8,650,000 against $6,292,000 this year, of which $1,085,000, against $857,310, would be for the lease and disposal of lands and resources.

**Geological Survey.** — An increase of more than $3,500,000 is proposed for the Geological Survey, for which the budget provides $20,000,000 as against anticipated expenditures this year of $16,222,400. The 1951 funds include $7,845,000 for topographic surveys against the current $5,750,000 and $3,925,000 for geologic surveys against $3,500,000.

The Survey would also get $515,000 for investigation of the mineral resources of Alaska, for which it had $500,000 this year, and $790,000 for administration of the leasing laws, against $725,000. The agency also is responsible for all geologic phases of exploration in Naval Petroleum Reserve No. 4, in Alaska, which will be somewhat reduced in 1951, for which only $230,000 is provided against $268,072 this year.

**Bureau of Mines.**—If any cut-back is to be made in the synthetic liquid fuels program of the Bureau of Mines as a result of recent developments in petroleum supply it will have to be ordered by Congress, for the budget carries a total of $9,699,571 for that activity, against appropriations for this year of $9,750,000.

The bureau also is to get $994,003, against $690,000 this year, for oil and gas investigations, and $31,850, against $16,590, for investigation and stimulation of the maximum development of the Missouri River Basin's oil and gas resources.

**Navy Department.** — The Navy Department is to get an appropriation of $11,000,000 for exploration and prospecting in Naval Petroleum Reserve No. 4, against $3,000,000 for this year, which is to be available until June 30, 1952. Its appropriation for operation and conservation of the other reserves will be only $4,000,000, against $9,500,000 this year, as the result of a cut in estimates for exploration and development in Reserve No. 1 (Elk Hills, Calif.), where the number of drilling rigs in operation will be reduced from seven to five.

Reserve No. 2 (Buena Vista Hills, Calif.), is entirely under lease and royalty collections amounted to $1,700,000 in 1949 and similar income is anticipated in 1950 and 1951.

Reserve No. 3 (Teapot Dome, Wyo.) has been shut in since 1928, but exploration is being conducted this year with a $25,000 appropriation to determine whether deeper pools exist.

The estimate for fuel for Navy ships in 1951 is $6,939,585 against $6,929,782 this year.

**Reconstruction Finance Corp.** — The Reconstruction Finance Corp., which showed a $6,395,074 profit from its synthetic rubber program in 1949, is expected to have a net loss from operations of $2,064,000 this year and $6,366,000 in 1951. The 1951 program was laid down in anticipation of the inability of the Government to dispose of its facilities by next June 30, when the present authority for government operation expires.

It is expected that the 1951 production will include 284,500 tons of general-purpose rubber against 305,000 tons this year and 51,000 tons of special-purpose against 56,200 tons. The actual production cost will be $103,500,000 against $113,600,000 this year, and the total expense, including allowance for depreciation, will be $137,966,000 against $149,164,000. Sales of rubber are expected to bring in $130,300,000 against $145,800,000, and other revenues will bring the total income to $131,600,000 against $147,100,000.

**Others.**—A number of other agencies whose operations are of interest to the oil and gas industry are also financed in the budget, in which the National Security Resources Board is given $3,500,000, the same as for this year, and the Federal Power Commission is given $4,494,400 against $4,048,500. The Interstate Commerce Commission is to get $482,565 for its railroad and pipe line valuation work, against $494,611 this year.

# Federal Oil Probe

## Congressional investigations of domestic oil reserves and "discriminatory practices" by Britain to be asked

WASHINGTON. — Resurrecting the cry that "we are running out of oil," Rep. Ivor D. Fenton of Pennsylvania last week introduced a resolution calling for a joint congressional committee investigation of domestic petroleum reserves.

Fenton told the House such an investigation would disclose that (1) the United States will soon face a shortage of domestic oil; (2) we are needlessly wasteful of oil and natural gas; (3) we cannot rely on increased imports in the event of war; (4) we cannot rely for years to come, and then only at a cost of billions of dollars, on the development of synthetic fuels, except from natural gas; (5) many coal mines are being abandoned, drowned out and permanently lost; (6) our railroads will be endangered both financially and physically, and there will be a shortage of locomotives and railroad cars.

**Oil-shortage dangers.**—Should war come, Fenton predicted, home owners would get less than half of their oil requirements, and natural gas might be shut off entirely in the eastern territory.

"The general public must be told again and again of the seriousness of this situation and made aware of the consequences to the individual," he said. "Home owners' needs will have to compete sharply with those of national defense, airlines, factories, mechanized farms, trucks, railroads, water carriers and other mobile users."

Fenton told the House that "considering the dangerous shortage of fuel oil which the country will certainly experience if there is any national emergency" he was "shocked" to discover that the military is using many million gallons to heat buildings in areas which are abundantly supplied with nearby coal. Veterans Administration buildings originally designed to burn coal are using oil, new federal housing projects use oil almost exclusively, oil and gas are being used increasingly to heat government buildings and many thousands of new homes have been constructed to burn oil or gas, he said.

As representative from Pennsylvania, Fenton was concerned over the future of coal as the country is increasingly tied to an oil and gas economy.

"The impact of these developments on our railroad transportation system must also be considered," he said. "World War II demonstrated beyond a doubt the absolute necessity for maintaining our railroads at or near peak efficiency. A serious decline in solid fuel traffic, which now amounts to more than a third of all rail freight, will be followed by a corresponding decline in equipment and will impair the ability of the railroads to meet a military or other transportation emergency.

"The present situation with regard to depletion of oil and natural gas reserves in this country is too serious to be allowed to continue without taking corrective measures. An investigation by a special joint committee to ascertain the facts and inform the public of them, I believe, will prove the necessity for remedial legislation and a national fuels policy."

**Foreign investigation.** — The investigation of oil reserves was one of two probes proposed in the first week of Congress, Representative Eugene J. Keogh of New York, a member of the House Small Business Committee, announcing his intention of calling Government officials to see what can be done about the British situation.

Keogh said the "discriminatory practices" proposed in the recent order curtailing the activities of American companies threaten to squeeze them out of world markets.

"It is quite possible that British companies are using these discriminatory practices to expand their operations in world oil markets to cartel proportions; and American companies, in order to survive, may be forced to the position of having to accept cartel agreements," Keogh said.

"The situation will not tolerate polite exchanges of notes or further subjection of government conferees to passive resistance of British representatives."

Keogh raised the possibility that Britain might use Marshall Plan funds to squeeze the American companies out of the world market. He expressed the hope that ECA will not approve the British refinery expansion program until his committee has had an opportunity to go into the matter with government officials.

"It was never intended that assistance in British recovery would in any manner contribute toward the elimination of American companies from competition in world markets, thereby requiring them to use domestic

*OFF AGAIN.—This 136-ft. "jackknife" derrick of Humble Oil & Refining Co. is starting its fourteenth move in the 7 months it has been in operation. It is part of Humble's Rig 11 which has been drilling wells in the 15-mile-long area of Charlotte and Jourdanton fields, Atascosa County, 45 miles south of San Antonio. In Charlotte field, the highly portable rig completed a well in the Navarro sand (5,200 ft.) in about 10 days. In Jourdanton field, a well was completed in the Edwards limestone (7,400 ft.) in 30 days. On this particular move, it was necessary to bulldoze a path through ½ mile of mesquite and widen 2 miles of narrow country road. The drilling mast, which weighs 30 tons, is being towed by a 20-ton tandem truck. The rear end of the mast rides on a dolly using two 56-in. bomber tires*

# WATCHING WASHINGTON

Bertram F. Linz

## Needed Explanation

Now that Congress is back in its partly refurbished chambers, news dispatches from Washington again will tell of proposals, plans, projects, and programs, which are based etymologically upon the term, "trial balloon."

A trial balloon is a brilliant thought, sometimes called a brainstorm, casually passed on to a more or less interested press in the hope it will be printed, thereby bringing undying fame to the thinker, but to be immediately disowned if public reaction is unfavorable.

A proposal is a trial balloon which was not punctured and therefore must be worth carrying a little further.

A plan is the working out of a proposal which has met the enthusiastic approval of not less than one government official who would have a finger in the pie if the necessary dough were procured.

A project is the shape in which a proposal, now a plan, is offered for official approval, with emphasis on the appropriation it would involve and the number of jobs it would make for the faithful.

And a program is the shape in which what was once a mere trial balloon is offered for adoption by Congress.

## Stalemate

The Anglo-American oil talks appear to be stalled on dead center, with the British delegation making no concessions and sidestepping suggestions by the United States for amelioration of last month's order which in effect makes the American companies mere agents for the sale of sterling oil.

With the State Department apparently unable to think of any argument potent enough to induce the British to ease the order, there is a possibility that the Economic Cooperation Administration is reconsidering its position and may revise Marshall plan authorizations for England downward.

According to men close to the negotiations, if they can be called that, the British are very apologetic about the necessity for cutting the American oil companies out of world trade but give the impression of being willing to take over all the worthwhile markets that are left.

What started last fall as a discussion which the State Department said would "analyze oil transactions affecting the sterling area in the light of the legitimate interests of the countries and companies concerned" has turned into a problem of major concern to a number of government agencies.

The military are concerned over the possible effects on our national security and availability of oil in the event of war. The National Security Resources Board is worried about the effect of a flood of cheap oil on the coal industry and on the railroads, which get a large part of their revenues from hauling coal. The Interior Department is apprehensive of the possibility that the domestic producers and small refiners will be restricted in their operations with a consequent slackening of exploration and development. And presumably the State Department is not unaware that Venezuela derives some 75 per cent of its government revenues from oil and might be thrown into a tailspin if markets for dollar oil are closed, and that American concessions in the Middle East are safe only so long as the governments there are satisfied with their revenues.

So far, there have been no indications whether ECA would act on its own initiative to withhold Marshall plan money, but in some quarters it is believed only specific instructions from Congress would bring drastic action.

## Third Attempt

Things are shaping up for another try to have the United Nations take over control of world oil resources.

The movement is backed by the International Cooperative Alliance and the International Cooperative Petroleum Association and will be the third effort to internationalize world oil.

Basis of the demand for UN control is the claim of monopoly by a few oil companies, which might not be too difficult to support today in view of Britain's effort to reduce the number by taking over a large part of the world oil trade.

The idea of UN control was given some official support back in 1946 in the famous broadcast in which State Department officials stressed the need for UN action "to insert order into the world oil picture." The reaction from the industry was prompt and violent, and even under today's conditions there is no indication that it has changed its position.

markets as a dumping ground for their foreign production," he said.

Meanwhile, there were indications that ECA would not grant any further authorizations for British refinery expansion until the extent of the program had been finally determined. There were indications, also, that the British were cutting back their program somewhat, but it was not apparent whether the cut-back would bring it down to anything like the level which ECA had set as desirable to meet England's needs without unduly disturbing international trade.

# Price Cutting

## High court asked to affirm Indiana Standard decision

WASHINGTON.—If good faith were adequate defense for discriminations in price which injure competition the whole intent of the Robinson-Patman Act would be nullified, counsel for the Federal Trade Commission argued before the Supreme Court this week, asking the court to affirm the decision of the Seventh Circuit Court of Appeals in the Standard Oil Co. (Ind.) case.

Cut adrift by the Department of Justice, which has consistently held that the cutting of prices by a seller in good faith to meet competition was legal, and opposed by 12 jobber groups, the commission argued that its original order was valid.

The case grew out of an FTC complaint charging that Standard had violated the Robinson-Patman Act by selling gasoline to four jobber customers in Detroit at prices lower than those it would grant to retail customers for equally large volume purchases. The company contended the lower prices were granted to meet the prices offered by competitors. It also challenged the commission's order on the ground that the business involved was not in interstate commerce.

Referring to the O'Mahoney bill now pending in Congress which contains a good-faith provision, commission counsel told the court that the question of what the law should be is a legislative matter solely for Congress. He added that the question before the court is simply the validity or invalidity of the commission's order under the existing law.

The proposal that meeting competition in good faith should be an absolute justification for price discrimination was considered and rejected by Congress in the enactment of the Robinson-Patman Act, it was contended. Therefore, commission counsel said, it was the intention of Congress to reduce such a defense to the status of evidentiary matter that may or may not be applicable to a charge of unlawful price discrimination.

The commission suggested that if Standard cannot sell to both tank-

car resellers and tank-wagon resellers in the same territory at different prices without injuring competition, it should abandon the practice of selling to both of these classes of customers in the same marketing area.

But as a practical matter, it told the court, its proposed order would not prevent the company from continuing to sell to wholesalers. FTC said that if the company notifies its wholesale customers it will refuse to sell to them if they resell to retailers at less than the posted tank-wagon price, there is little doubt that the wholesalers will comply.

Company counsel told the court that the decision, if affirmed, would totally upset the existing competitive situation wtihout improving it, and impose on the company the impossible task of policing all its customers without any restrictions being placed on the activities of its competitors.

The brief of the jobber associations charged that if a company is required to discontinue selling to wholesalers at a different price from which it sells to retailers, the former will be eliminated, and argued that meeting a prevailing price in good faith does not injure competition and the commission's construction of the act to the contrary is "unreasonable and illogical."

# Higher Taxes

## Truman to hit corporations to offset excise-tax cuts

WASHINGTON.—President Truman last week told Congress he would ask for a "moderate" increase in taxes and would submit a series of proposals to strengthen the antimonopoly laws, assist small business, and encourage the growth of new enterprises. He did not renew his demand of a year ago for legislation giving him authority to fix prices and build plants for materials in short supply.

The President's discussion of taxes was seen as paving the way for an increase in the corporation rate of 38 per cent by at least 2 and possibly 7 percentage points, largely to offset the reduction or elimination of some of the wartime excise levies regarding which there is increasing complaint.

He did not, however, directly sanction repeal of any excise taxes. His specific tax proposals will be transmitted to Congress shortly, and he said they would be designed to reduce present inequities, stimulate business activity, and yield a moderate amount of additional revenue.

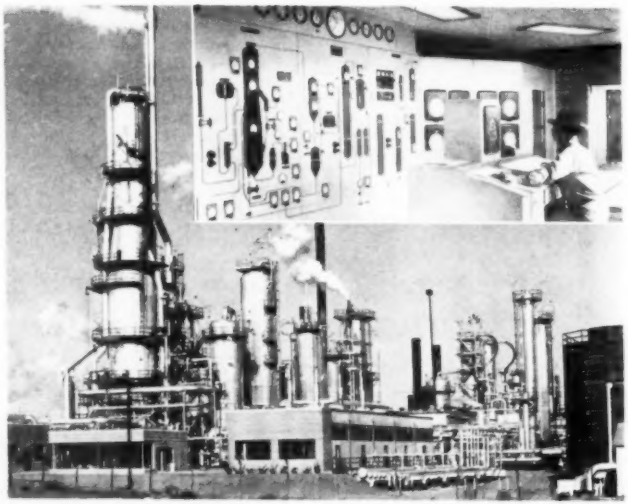
Without mentioning oil or natural gas, the President stressed the need for federal action to conserve natural resources. "Government investment in the conservation and development of our resources is necessary to the future economic expansion of the country."

What the President meant by his reference to the antitrust laws has not been made clear in official circles. In some quarters it is expected to herald a drive to restrict the size of corporations, particularly as he linked his remarks to a request for enactment of legislation prohibiting one corporation from acquiring the physical assets of another where such action would lessen competition.

The 1950 State of the Union message was marked by a shift in the President's attitude toward business. He pledged the Government to protect initiative and enterprise, guard the incentive necessary to production, and help maintain the conditions vital to economic growth. He expressed no criticism of industry, and impliedly gave it credit for an assist in meeting and reversing last year's downturn in economic activity, the first of significant proportions since the war.

Over the years to come, the President saw the need for "hundreds of thousands of new and independent businesses" if the economy is not to fall under the control of a few "dominant economic groups whose powers will be so great that they will be a challenge to democratic institutions." To avert such a possibility, he said, monopoly must be curbed and aids provided for independent business.

The President's recommendations were largely devoted to views with which Congress and the country are thoroughly familiar regarding the continuation of the Marshall plan, participation in the International Trade Organization, conservation of natural resources (but without any reference to petroleum), repeal of the Taft-Hartley Act and extension of social security.



*DRIVE-IN REFINERY.—Cosden's new Big Spring, Tex., catalytic cracking unit features a novel twist in design. The cat-cracker control house (lower left of large photo) is glassed in on one side. A diagrammatic sketch of the "cat" unit is printed on the control board and gages and indicators placed at the proper points on the sketch. (See inset.) The control operator can view all necessary instruments while visitors can see them and the operator, too, without entering the control house itself. Refinery officials are planning to construct a paved road from Highway 80, which runs by the refinery, past the control room so that curious passers-by may stop and watch the operation of the unit.*

## Federal Synthetics Boost

WASHINGTON.—Discontinuance of the coal-to-gasoline project of Standard Oil Development Co. and Pittsburgh Consolidation Coal Co. didn't kill the Government's appetite for more synthetic-fuels study.

President Truman last week sent to conference the annual review of his Council of Economic Advisers, which urged continued emphasis on the synthetics program as "desirable as a part of the Government's long-range effort to develop new techniques and alternative sources of supply in the interest of conservation of diminishing resources."

The council's report accompanied the President's message on the economic situation in which, however, he did not include either program as a part of his recommendations.

Discussing the natural-resources situation, the council pointed out that the day of the individual shoe-string operator is drawing to a close because, primarily, of the great expense involved in modern operations.

Great opportunities still lie before private capital for the further development of natural resources, and the gathering of geologic, topographic, and other basic data should be speeded up, the council said.

## Import Figures

### Drop of 57,000 bbl. daily shown in November imports

NEW YORK.—Imports of crude oil and petroleum products into continental United States averaged 721,741 bbl. daily in November, according to figures of the Department of Commerce. This is about 57,000 bbl. daily less than the record set in October but about 61,000 bbl. daily more than the average for September.

Crude imports averaged 456,620 bbl. daily compared with a daily average of 485,839 bbl. in October. Major changes for the month by countries of origin include a decrease of 2,700,000 bbl. from Venezuela and a gain of almost 1,000,000 bbl. in receipts from Kuwait. Imports from Columbia were up 400,000 bbl. for the month.

Product imports dropped about 28,000 bbl. daily from the October level but were 16,000 bbl. daily more than the September average.

Exports from continental United States, excluding shipments to territories, averaged 253,609 bbl. daily, a decrease of about 22,000 bbl. daily from October. Gasoline exports declined 654,000 bbl. and lube-oil shipments were off 220,000 bbl.

**IMPORTS INTO CONTINENTAL UNITED STATES**
(Thousands of barrels)

| | Nov. 1949 | Oct. 1949 |
|---|---|---|
| Crude: | | |
| Mexico | 459 | 544 |
| Columbia | 1,328 | 920 |
| Venezuela | 8,193 | 10,910 |
| Kuwait | 3,002 | 2,062 |
| Saudi Arabia | 627 | 625 |
| Other | 89 | |
| Total crude | 13,698 | 15,061 |
| Barrels daily | 456,620 | 485,839 |
| Products: | | |
| Residual fuel | 7,564 | 8,711 |
| Other products | 390 | 368 |
| Total products | 7,954 | 9,079 |
| Barrels daily | 265,121 | 292,871 |
| Total all oils | 21,652 | 24,140 |
| Barrels daily | 721,741 | 778,710 |

**EXPORTS***

| | Nov. 1949 | Oct. 1949 |
|---|---|---|
| Crude | 3,010 | 2,916 |
| Gasoline | 1,804 | 2,458 |
| Lube oils | 756 | 976 |
| Other products | 2,038 | 2,204 |
| Total all oils | 7,608 | 8,554 |
| Barrels daily | 253,609 | 275,935 |

*Does not include shipments to territories which in past months have averaged 30,000 bbl. to 40,000 bbl. daily.

## FPC Power Upheld

WASHINGTON.—A natural-gas pipe-line company operating entirely within a single state is subject to jurisdiction of the Federal Power Commission if it distributes gas brought across state lines.

This was the ruling of the Supreme Court this week in deciding a 10-year argument between the FPC and East Ohio Gas Co., Cleveland. The company's system is entirely in Ohio but it distributes some natural gas purchased from other companies after being transported from West Virginia and the Southwest.

This has been regarded as a key case in testing the commission's jurisdiction over intrastate gas companies, and about 40 similar cases may be settled on the basis of this decision. It may also have some bearing on the controversial question of the commission's jurisdiction over wholly intrastate producing companies which sell natural gas to interstate pipe lines, though this aspect was not involved in the East Ohio case.

It was a five-to-two decision, with two justices not participating. For the majority, Justice Hugo L. Black said:

"We find no language in the act indicating that Congress meant to create an exception for every company transporting interstate gas in only one state.

"Regardless of whether it might have been wiser and more farseeing statesmanship for Congress to have made such an exception, we should not do so through the interpretive process. There is nothing in the legislative history which authorizes us to interpret away the plain congressional mandate."

# WEST COAST

## Production Law

### California independents to push conservation controls

LOS ANGELES. — West Coast oil companies through their Oil Producers Agency of California have undertaken sponsorship of a conservation law which will possibly be presented the California Legislature this year.

A resolution has been drawn up by the agency "to sponsor and encourage all legislation that will conserve the supply of oil in California." The resolution was unanimously passed at a special meeting of the agency board of directors January 3.

In summation the resolution states, "Oil Producers Agency of California, representing independent oil producers throughout the state . . . declare it to be the policy of the agency to sponsor such additional and proper legislation as may be necessary to conserve the petroleum resources of the state, having due regard to equitable allocation of production and ratable taking."

A committee representing independent operators and independent oil organizations has about completed drawing up a suggested law for submission to the state legislature. The work of the committee has been largely based on studies of existing conservation laws in force in other parts of the country.

The California Legislature meets this year for the biennial budget session, but action by Governor Warren will be required to place a conservation law on the agenda for this session. Plans are being made to request such action.

If the bill is not placed on the agenda of the budget session, action must wait for the next regular session which meets in 1951.

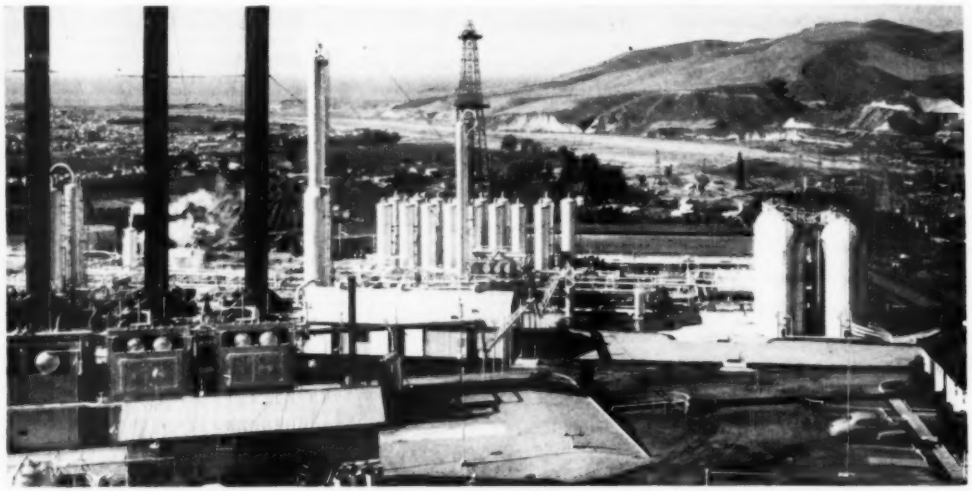
In transmitting the resolution to the members of the agency for their action, L. A. Cranson, president of the agency and executive vice president of Honolulu Oil Corp., said: "This action was taken in the light of current conditions and of those foreseen for the future. It is your board's belief that only through proper state legislation can the oil industry develop those production practices which will lead to the conservation and greatest ultimate recovery of the state's oil and gas resources. The board believes this to be especially true in view of the fact that the attitude of the federal Government has, since the war, made it impossible for the industry to carry on a concerted conservation program on a voluntary basis."

## Gas Wastage Charged

LOS ANGELES. — Wastage-of-gas charges have been filed by the State of California against 21 corporations and 19 partnerships comprising the producing groups in Placerita Canyon field. The firms are accused of allowing 30 million cubic feet of gas per day to vent to the air. The action


### Index Ready Soon

**The complete editorial index of The Oil and Gas Journal for 1949 is now in preparation and will be ready for distribution at an early date. It will list articles published during the year by titles grouped by subject matter, and with cross-references, and also an index of authors. Bound separately, it will be mailed without charge to any subscriber requesting a copy. Address requests to Circulation Department, P. O. Box 1260, Tulsa.**



*FOURTH FACE LIFTING.—This gasoline plant of Shell Oil Co. in Ventura Avenue field, California, has just been through its fourth modernization program. Most noticeable addition is the 100-ft. rich oil deethanizer. The series of modernization steps mirrors the history of the natural-gasoline and L.P.G. industry in California. The original plant was built in 1917, designed mainly to recover gasoline. Crude oil was used as the absorbing agent. In 1926 the unit was moved to a new site and redesigned to recover a higher percentage of natural gasoline. With the development of the alkylation process by Shell in 1939, plans were drawn for the third remodeling. This time the materials recovered included 95 per cent of the butane, as compared with the former 45 per cent. This modernization was completed in 1941. Now with the increased propane demand, the latest changes were made. The unit as it now stands will extract up to 85 per cent of the potential propane in wet gas, providing about 75,000 gal. per day. Throughput remains between 60,000 and 65,000 M.c.f. per day of natural gas. Recovery of liquid hydrocarbons is about 140,000 gal. per day. The installation of the rich-oil deethanizer will make it possible for Shell to produce marketable ethane with very little change in the present plant*

was started by the State Department of Natural Resources under authority of the Natural Resources Code. This code prohibits wastage of gas produced in conjunction with oil, and under this code venting of gas is prima facie evidence of gas wastage.

A restraining order which so far has had no apparent effect on production from the field has already been obtained by Warren T. Hannum, director of the department of natural resources. A permanent injunction is now sought to prevent "unreasonable" waste of gas. A hearing is set in Superior Court for January 13.

Gasoline content of the gas is set at a gallon per 1,250 cu. ft. Recoverable reserves of gas are set at 7 billion cubic feet.

### Most Productive Counties

PASADENA.—Two California counties, Kern and Los Angeles, led those of the rest of the nation in mineral output during 1949, according to figures compiled by Oscar Reinholt, Pasadena, Calif., author and statistician.

The two counties were in first and second places, respectively, for the fourth straight year.

Total value of mineral production from Kern County topped $240,000,000 during 1949. Approximately 70 per cent of this total output is credited to petroleum with an additional 7 per cent to natural gas.

The Los Angeles County mineral yield exceeded $230,000,000. About 42 per cent of this sum is petroleum and 50 per cent the combined value of petroleum and natural gas.

Together the two counties accounted for approximately one-half of the total mineral production from California for last year. Better than 80 per cent of the total dollar value of this production is due to petroleum, natural gas, and natural gasoline.

Runners-up after the California counties are Luzerne County, Pennsylvania, heavily anthracite coal, and Salt Lake County, Utah, mainly copper.

Fresno, Orange, and Ventura counties in California also figure in the top 15 counties on the list.

## ROCKY MOUNTAIN

### Profitable Sand

#### Pilot plant proves oil can be extracted commercially

VERNAL, Utah.—Experiments with the extraction of oil from asphaltic sands near here have reached a very interesting stage. Results obtained so far indicate that the oil can be recovered in commercially profitable amounts.

A pilot plant has been in operation for about 2 years. It will continue to be worked through this winter with the decision on the building of a full-scale extraction plant held off until that time.

The sands being worked occur as an outcrop. They vary in thickness from 90 to 130 ft. They are coarse silica sands, somewhat compacted, and saturated with oil. The sands contain 34 to 67 gal. of oil per ton of sand, averaging a little more than 1 bbl. per ton. By weight the oil content runs, as an average, 17-18½ per cent.

The oil itself is naphthenic and contains no sulfur. Gravity runs 10° A.P.I. with a softening point above

80° F. and melting point about 90° F.

At approximately 400° F. the oil breaks down into a gas oil and complex organic gums. These gums make up approximately 46 per cent of the oil, and are mainly polynuclear resins. There is considerable interest in the commercial value of recoverable substances from this gum.

For the pilot-plant operations the sand is collected by tractors equipped with dozer blades. For the commercial setup, strip-mining techniques will be employed.

A solvent is added to the sand and the whole extracted with hot water at 170° F. After the oil is extracted, indications are that the best refining method will be catalytic vis-breaking to gas oil and gum residue.

The original interest in this operation was under the Utah Chemical & Oil Co. This organization is now being bought out by several partners, all West Coast or Rocky Mountain oil men. Senior partner is Owen M. Collett, of Collett Tanklines. Engineer is T. P. Remy of Hollywood, Calif., formerly with The Texas Co.

The interest of the partners will cover 9,000 acres of outcropped sands. The U.S.G.S. estimates the oil content for this area at one to two billion barrels. The sands continue beyond the 9,000 acres but dip rapidly, greatly increasing mining costs. All sands within the present area of interest can be readily reached by surface mining.

# INDUSTRY AFFAIRS

## Research Plug

### Murphree sells chemists on its value in peacetime, war

NEW YORK.—The fact that industry backs up its faith in research with large expenditures of capital is one of the major factors in increasing the standard of living and maintaining our national defense, E. V. Murphree told 1,000 chemists here last week.

Murphree, president of Standard Oil Development Co., spoke at a dinner in the Waldorf Astoria Hotel after receiving the Perkin Medal, awarded annually since 1904 to an outstanding figure in industrial chemistry by the American Section of the Society of Chemical Industry.

The dinner was held jointly by the awarding society, the American Institute of Chemical Engineers, and the Electrochemical Society.

Murphree cited three important World War II developments in applied chemistry to show the important role of research to national defense.

These developments he listed as fluid catalytic cracking, hydroforming, and butyl rubber. Each process, originating in prewar research, was approaching commercial possibilities when war began.

Development of butyl rubber, he said, up to now has cost $11,000,000. In catalytic cracking, the fluid process was just developing at the start of war. The urgent need for butylenes and isobutane, derived from catalytic cracking, called for stepping up plans for production to the point that 32 commercial plants were being designed and constructed before the first commercial unit was placed in operation.

These, plus the attendant alkylation facilities and synthetic rubber plants dependent upon future fluid units, cost about $1 billion. Fortunately, he said, the first unit erected operated smoothly from the start.

*E. V. Murphree, left, is shown receiving the Perkin Medal from Dr. Marston T. Bogert, senior past president of the Society of Chemical Industry at a dinner in the Waldorf-Astoria Hotel, New York.*

Continued private research in peacetime also is important, Murphree said.

"The development of new or improved products and new or improved techniques in our industries provides for continuing high rates of employment and increases our standard of living.

"Such developments are the life blood of our national defense and of our western civilization. The incentive for the financial risks involved in creating these developments comes from the expectation of profit for those who are successful. I hope we never see the day when through restrictive legislation or other government action this expectation ceases to exist."

## Compact Drops Committee

OKLAHOMA CITY.—The economics advisory committee of the Interstate Oil Compact Commission has been discontinued by action of the executive committee meeting here January 7.

In announcing the action, Gov. Roy J. Turner of Oklahoma, 1950 chairman of the commission, explained that since several other agencies and associations periodically review the economic situation it was considered an imposition on the members of this committee to ask them to prepare summaries of past activities. Originally this committee issued forecasts of demand for petroleum products as a guide to the regulatory agencies of the member states, but during the past year its reports have been limited to past and current statistics.

All other standing committees of the commission were reappointed, with only a few changes in membership due to shifts in the personnel of participating state agencies. The executive committee also allocated the budget of $80,000 for 1950 as authorized by the New Orleans meeting.

The theme for the spring meeting of the commission at Biloxi, Miss., May 4-6, was set as "Oil and Gas Conservation and the Public Interest."

## Lower Product Rates

Mid-Continent and Southwest refiners will make substantial savings on rail shipments of their petroleum products to the Middle West after March 1, when railroad freight-rate reductions go into effect.

The reductions will result from cancellation of rate increases which were made by the roads in August 1949. Amount and percentage of reduction in rates on and after March 1 will vary, with the largest cut being made generally in cases of the longest distances the products are hauled.

Group 3 (Oklahoma - to - Chicago) present rate of 3.762 cents per gallon of gasoline will be reduced to 3.432 cents, a reduction of 9 per cent. In the case of Group 3 (to Kansas City) the present rate of 2.178 cents will be set at 2.046 cents, a reduction of 6 per cent.

## Virginia Oil Law

RICHMOND.—A proposal that Virginia adopt an oil and gas conservation law has been made to the governor and the legislature by a special commission created last year to study the subject.

The proposal includes creation of a commission on natural gas and oil resources within the state Department of Conservation and Development, to be composed of the state geologist, the chief mine inspector, and a representative of corporation commission.

# Additives Defended

## S.A.E. meeting told chemical improvers in high-v.i. lubes stand up in use. New antiknock theories are advanced

C. O. Willson

DETROIT.—Strong support for the disputed contention that higher viscosity index in motor oils obtained through the use of chemical additives carries through under actual service conditions was given here January 10 in a paper presented before the fuels and lubricants group at the annual meeting of the Society of Automotive Engineers.

Differing somewhat from the conclusions of other recent investigations, four technologists of Standard Oil Development Co.—C. L. Fleming, Jr., B. W. Geddes, N. V. Hakala, and C. W. Wesiel—presented a paper on "Performance of High Viscosity Index Motor Oils."

They reported that the use of the additive improvers was justified on a basis of performance. Their conclusions were:

1. High-v.i. motor oils offer the readiest means of combining good low-temperature starting characteristics with low oil-consumption properties in a single crankcase lubricant.

2. The low-temperature starting properties of high-v.i. oils containing certain improvers are identical with those of straight mineral oils having the same viscosity at the low temperature under consideration.

3. The oil-consumption properties of high-v.i. oils containing improvers are identical with those of straight mineral oils having the same viscosity at 300° F.

In a symposium on the combustion of fuels, four papers revealed that additional studies are needed before the petroleum and automotive industries will have a completely satisfactory method of correlating motor-fuel properties with performance.

The reports revealed that present-day engine design does not take full advantage of the properties now available in motor fuels. Furthermore, some beliefs in regard to performance characteristics are not supported by the findings of the research and development laboratories.

**Fuel distribution.**—Maldistribution of fuels in certain present-day engines is more or less comparable with that reported for engines of 10 to 15 years ago. This conclusion was reached by R. W. Donahue and R. H. Kent, Jr., research engineers of Sun Oil Co., following a recent study of mixture distribution in a multicylinder engine.

Reexamining an old and recognized problem on which little has been reported in the past decade, they summarized some pertinent observations.

"It has been shown that certain design factors affecting the intermixing of air and fuel in the induction system are of major importance in the distribution of air and fuel to the individual cylinders of the engine. Such design features as the position of the choke valve and its mounting, or any other obstruction in the air passage, can alter the quantitative mixture distribution patterns of the particular engine studied significantly more than reasonably large changes in engine speed, mixture temperature, or fuel volatility.

"It has been shown that, contrary to some previous thinking, the lightest components of fuels are unevenly distributed, as well as the heavier materials. It has also been shown that the antiknock quality of the fuel reaching each cylinder depends to a large extent on the variation in octane quality with boiling range of the original fuel and this quality can be controlled to a considerable extent by maintaining even quality between the light and heavy fractions of the fuel."

**Detonation.**—From the great volume of literature covering studies of detonation in internal-combustion engines, one might suppose that all important questions on the subject were now answered. Not so, said D. R. deBoisblanc, of Phillips Petroleum Co.'s research department, in his paper entitled, "Some Fundamental Aspects of the Measurement of Detonation." He went further to state that widely accepted theories (Ricardo on simple autoignition and Sokolik and Voinov on the detonation wave) are now being reexamined.

DeBoisblanc defined detonation in terms of the maximum differential rate of change of pressure and notes its precise measurement electronically. Pointing to the undesirable features of measurement systems based upon cylinder resonant modes and sharp filters, he described the advantages of measuring what he terms "a quantity extracted from the transient pressure disturbance" (knock) without interference from cylinder resonances.

**Fuel ignition.**—In a paper on the ignition of fuels by rapid compression, C. F. Taylor, E. S. Taylor, J. C.

*SALVAGED STRAINERS.—This strainer installation, at the Chelsea, Okla., pump station operated by Shell Pipe Line Corp., serves the Ozark System 22-in. and the Shell 10-in. lines which deliver crude oil from Cushing, Okla., to Wood River, Ill. The strainer at right functions on the suction side of the station to protect centrifugal pumping equipment on the 10-in. line. (Beyond Cushing there are no strainers on the main 22-in. stream.) The other two strainers shown remove abrasive matter to protect mechanical seals. These are preliminary strainers which function ahead of those on the sides of the pumps in the station building in the background. The middle strainer protects 10-in. mechanical-seal facilities, while the one at left protects seals of the 22-in. pumps. These duplex strainers were salvaged from a dismantled Shell diesel station which formerly served two 10-in. lines.*

Levengood, W. A. Russell, and W. A. Leary of Massachusetts Institute of Technology gave support to the auto-ignition theory of detonation. That theory is that knock occurs when autoignition of the end gas, which is the unburned portion of the charge ahead of the flame front, occurs so suddenly as to give rise to intense pressure waves.

The authors in their investigation found that engine detonation can be reduced by lowering the inlet temperature and the compression ratio, running at rich or lean fuel-air ratios, and adding tetraethyl lead.

**Engine knock.**—In an exhaustive report, Edmond R. Retailliau, Harold A. Richards, Jr., and Minor C. K. Jones of Standard Oil Development Co. concluded that the precombustion reaction in the spark-ignition engine plays an important part in engine knocking. They reported that the nature and extent of the prereactions vary with the hydrocarbon type employed as fuel, with engine design, and with engine-operating conditions.

In regard to hydrocarbons, they found the aromatics resist prereaction and remain unchanged during compression prior to ignition. In contrast, the paraffin hydrocarbons have a tendency to prereact.

**Consumption.**—R. J. Greenshields of Shell Oil Co. told of the "mileage marathon" contest at Wood River, Ill., refinery in which gasoline consumption as high as 150 miles per gallon was obtained. It was explained that while the feat had little significance in today's car operations it did point to improvements in car design which would result in fuel economy.

All friction was reduced to a minimum in the test. Tires were inflated to 110 lb., S.A.E.-10 motor oil was used as lubricant, the compression ratio was 10:1, an overdrive was installed, and the carburetor was set for maximum economy.

# Improvements in Fuels

## Boyd tells S.A.E. industry will be called upon to provide higher octane ratings in gasoline, other developments

DETROIT—Petroleum refiners will be called upon to supply still higher octane ratings in gasolines and probably improvement in other operating characteristics.

These future requirements were emphasized here January 11 at the annual meeting of the Society of Automotive Engineers by T. A. Boyd, for many years associated with General Motors research laboratories as a motor-fuel expert.

Boyd, who more than 30 years ago collaborated with Charles F. Kettering and the late Thomas Midley, Jr., in the discovery of tetraethyl lead as an antiknock compound of motor fuels, in accepting the Harry L. Horning memorial award of S.A.E., declared that the end had not been reached in motor-fuel quality. The award is given "in recognition of distinguished service in the field of mutual adaptation of fuels and engines."

Boyd stressed the economic gains and the contributions to conservation of the higher octane fuels, explaining that since 1930 the efficiency of the average automobile engine has been increased 30 per cent.

He said this meant a saving in the nation's gasoline bill of 2 billion dollars annually. He added that recent research has shown that another 30 per cent savings is possible when higher octane rating fuels are made available for still higher compression engines.

"All these investigations of fuels and how they perform in engines, although fairly extensive in scope, have not yet yielded a thorough understanding of the subject," Boyd said. "They have produced no explanation of why the structure of a hydrocarbon influences the way it burns in respect to knocking behavior, or why an antiknock exerts the remarkable effect it does. The fact is that we are still a long, long way from having attained a complete understanding of what happens when fuel burns in gasoline engines."

Boyd explained the early research work when previous to World War I it became apparent that the tendency of motor fuels to knock was a limiting factor in the use of the internal-combustion engine.

"The first research tools," he said, "were a one-cylinder air-cooled engine, a British optical indicator, a piece of photographic paper wrapped around a tomato can, two pieces of lath, and a pair of shingle nails for pivots. This crude instrument gave the first conception of what knock is."

The widely known chemical engineer also explained the "scientific fox hunt" which resulted in the discovery and use of tetraethyl lead as a commercially feasible compound to increase octane ratings, pointing out that this research and that involving hydrocarbon molecules and synthetic fuels have been major factors in the development of both the automotive and petroleum industries.

"Through what it has done to stimulate catalytic cracking, polymerization, isomerization, alkylation and other new forms of petroleum processing, it has helped to bring about the modern revolution in petroleum," Boyd said. He estimated that 70 per cent of the high-octane gasoline used in World War II was composed of hydrocarbons made by synthetic methods.

# SOUTHWEST

# Ranching to Oil

## Scurry County takes change in stride; 180 wells drilling

**D. H. Stormont**

SNYDER.—A year ago this West Texas county's slogan was "Where Farmers Ranch and Ranchers Farm"; in the entire county there were only a dozen or so drilling rigs.

Now it is "Scurry County, Where the Oil Flows and the Cotton Grows," and there are 180 drilling wells, of which 161 are within proven oil fields.

All but a few of these 161 drilling wells are associated with the 6,700-7,000-ft. Canyon reef fields. Spread over an area some 20 miles in length and from 3 to 6 miles in width, they represent the greatest concentration of drilling rigs in West Texas history.

Bulk of the 19 wildcatting operations also is concentrated within this area of some 50,000 acres. The remainder, about 8 rigs, are within about a 25-mile radius of this thriving town. All are seeking reef production associated with or similar to the prolific North Snyder-Sharon Ridge limestone reef mass, which has over 700 ft. of producing section in its areas of greatest reef buildup. Or failing to find reef production, they probably will seek oil production in the underlying Strawn or deeper Ellenburger formations.

That the number of drilling rigs will continue to increase, throughout the next month or so, at least, is reflected by the constant rise in the number of new locations staked weekly. Last week almost 40 were staked, to bring the total number of active locations within fields up to 96. In addition there were seven active wildcat locations. New producers now are being completed at the rate of about 20 per week. With the number of drilling operations still on the upgrade, the completion rate very shortly should reach 100 monthly.

As might be expected in a development largely controlled by independent producers, these rigs were working for a total of about 70 operators. Standard Oil Co. of Texas, with 17 rigs in North Snyder and another on a 3½-mile step-out, continues to be the most active operator. In Diamond-M, Lion Oil Co. is continuing to keep 16 rigs active. Magnolia Petroleum Co., because of its large holdings, has stepped up its development

program and now has seven rigs busy in Kelley and four in North Snyder. Except where drilling contractors are drilling for their own accounts, almost all drilling is on a contract basis.

**New production.**—The Texas Co., a fairly late-comer in the reef play, last week completed its first well on its 30,000-acre Fuller lease to extend the productive limits of North Snyder field ¾ mile to the northeast. The No. 1 Fuller, which was completed for a flowing potential of 857 bbl. daily on a 1-in. choke, topped the reef at 6,812 ft., or a subsea depth of 4,384 ft. In so doing it further indicated that the field's northern limit may be just a few locations away as it was approximately 100 ft. low to the closest well to the southwest. Reefs having the undulating characteristics they do, however, tests on further northeast may find the reef again building up.

Texas Co. 2 Fuller, instead of being an offset to the first well, has been staked some 8 miles northeast as a southern offset to J. A. Chapman Producing Co. 1 Cogdell. This new discovery, also in a Canyon reef, likewise was completed last week to give extreme southern Kent County its first such production. The pool opener topped a reef at a subsea depth of about 4,365 ft. and was completed flowing for a potential of 595 bbl. through a ½-in. choke. The crude was of 41.7° A.P.I. gravity, or only a degree or so lower than the average gravity of oil produced in the North Snyder-Sharon Ridge trend of fields. *(For other developments in Scurry County last week see West Texas field reports, page 110).*

# Minimum Gas Prices

## Establishment of field price minimums may come before Texas Legislature in 1950; price now varies 7 cents

**D. H. Stormont**

DALLAS. — Suggestions for establishing minimum field prices for natural gas are becoming increasingly common in Texas.

The subject may come before the Texas Legislature, soon to convene for its 1950 session, through request for legislation establishing a minimum price by statute or authorizing the Railroad Commission to set minimum field prices.

Oklahoma and Kansas have placed minimum prices on natural gas, either by statute or commission order. Another suggestion is that gas prices be posted by districts, counties, or fields, as is done with crude oil.

The Texas Independent Producers and Royalty Owners Association has indicated that it may take the lead in this movement, though it has not endorsed any specific type of action.

One of the chief complaints is against the lack of uniformity in prices paid in different parts of the state for gas of the same type.

For example, a fairly recent study showed that the average prices being paid for sweet gas varied from 3.7 cents per thousand cubic feet in the Texas Panhandle to 9.6 cents in the southwest and 10.1 cents in East Texas. For casing-head gas the price varied by districts from 2.4 to 13.5 cents per M.c.f., and for sour gas from 2.9 to 5.84 cents per M.c.f.

Part of this variance is due to the number and nearness of pipe-line outlets, but probably a greater factor is the date when the gas-purchase contract was executed.

These contracts are always on a long-term basis, so that many contracts made 10 or 15 years ago are still in force. And since they were made at a time when gas was less in demand and the dollar was not inflated to the extent it is today, the price was well below current contract prices. Many of them are in the neighborhood of 3 cents, whereas last year as much as 10 cents per M.c.f. was being paid in fields close to interstate pipe lines.

Only a surprisingly few years ago Texas natural gas was generally regarded as being of only little value at the well head, or at plants after its natural-gasoline content had been removed.

Because of the construction of large-diameter, long-distance pipe lines from the Southwest to both the East and West coasts and into the Middle West, producers are becoming increasingly conscious of the income to be obtained from natural gas.

Largely because of the increased demand for gas for out-of-state transmission, average well-head prices have practically doubled in the past 5 years.

Figures of the Texas State Comptroller of Public Accounts show that in 1946 the average price for all natural gas (sweet, sour, and casing-head) was 3.21 cents per M.c.f. In 1946 the average increased to 3.38 cents, and in 1947 was up to 4.36 cents. In 1938, when 2.604 trillion cubic feet (net) of gas was produced, the average price received by the producer was 5.33 cents per M.c.f.

By types, the 1948 production was 1,534 billion feet of sweet gas averaging 5.95 cents, 812 billion feet of casing-head gas averaging 4.71 cents, and 257 billion feet of sour gas averaging 3.65 cents.

Detailed figures for 1949 are not yet available, but it is estimated that the average price rose to about 6.2 cents per M.c.f.

## Giles Withdraws

HOUSTON.—A potential candidate of interest to the oil industry—Bascom Giles, commissioner of the general land office—withdrew from the Texas gubernatorial race last week.

In a public announcement, Giles said he anticipated that the coming year will be "one of the most crucial in the general land office's history." He described the tidelands fight as a tremendous obligation to him in his public office. The commissioner intimated that Atty. Gen. Price Daniel, a fellow member of the school land board, should also give up gubernatorial ambitions until the dispute is settled.

In another development in the gubernatorial race, Caso March, a perennial candidate, advocated two new taxes for the oil and gas industry. He asked for a tax of 2 cents per 1,000 cu. ft. on natural gas exported from Texas. And, he advocated a tax on gasoline at the refinery at the rate of 1 to 2 cents per gallon.

## Premier Cuts Purchases

FORT WORTH.—Premier Oil Refining Co. has cut its purchases of crude oil in West Central Texas by 60 per cent.

A company announcement said that high pipe-line transportation costs and heavy imports were responsible for the move. The action affects producers in Young, Stephens, Shackelford, Eastland, Erath, Comanche, and Palo Pinto counties.

Premier said pipe-line transportation costs are 17 cents a barrel higher for crude moved from West Central Texas to the Gulf Coast than for similar crude from East Texas.

## Price Cut Not Met

DALLAS.—Last week's action by Onyx Refining Co. in reducing the price of West Central Texas crude oil by 7 cents a barrel has not yet resulted in similar cuts by other purchasers. *(See The Oil and Gas Journal, January 5, page 33.)*

In fact, spokesman for Humble Oil & Refining Co., the largest purchaser in the area, say the company does not plan to meet the price cut. Likewise no action has been taken by Premier Oil Refining Co., second largest buyer of crude in West Central Texas.

In general, crude purchasers agree with Onyx's vice president, Jack Levering, who said, "We don't consider this adjustment a forerunner of a general break in the crude market."

# Eightieth Birthday

## Ohio Standard looks back over unique history marked by two cycles from small independent to major oil company

CLEVELAND.—A history unique in the oil industry was marked here this week when Standard Oil Co. (Ohio) celebrated its eightieth birthday.

Twice in its lifetime it ran the complete cycle from a small independent to a large integrated company.

Starting from scratch, it became the parent of the Standard Oil Trust, with world-wide operations. Then the trust was dissolved, and it found itself once more a little, independent marketing company.

It has taken another generation to build itself up to its present position as a major factor in the oil business of Ohio.

On January 10, 1870, a small group of Clevelanders incorporated, under the laws of Ohio, a company which they named Standard Oil Co.

That name was adopted because, at that time, there were no standard specifications in the industry for kerosine and other oil products. Few companies had any standard specifications even for their own products.

During its first 12 years, it was the parent company of an organization that made Cleveland the oil metropolis of the world.

As properties were acquired all over the country, separate companies were organized to own and operate them, and the stock of these companies was taken, not by Standard Oil Co. itself, but by trustees who held it for the benefit of the parent company and stockholders.

In 1882, in accordance with the trend in those days to use the trust form of business association, the Standard Oil Trust was created, and the trustees were the directors of Standard Oil Co. To the trust was transferred all of the stocks and assets which had been held in trust for Standard Oil Co., and the latter's stockholders exchanged their shares of Standard Oil Co. capital stock for shares of beneficial interest in Standard Oil Trust.

Thus Sohio, the parent organization, became a subsidiary for a few years.

By 1899, New Jersey had broadened and liberalized its corporation statutes to meet the needs of growing, modern business and all of the assets of Standard Oil Trust were transferred to Standard Oil Co. (N. J.)

In 1911 the United States Supreme Court issued a dissolution decree, ordering Standard Oil Co. (N. J.) to divest itself of ownership in some 33 subsidiaries, among which was Sohio.

Thus, Standard Oil Co., here in Ohio, came back to its original state as an independent Ohio company, but it owned nothing more than a little 5,000-bbl. refinery, a string of bulk stations, a fleet of tank wagons, and a marketing business confined to the state of Ohio.

Sohio was independent again, but it was a skinny little orphan.

In 1911 the automobile industry was just getting under way and the revolution of the petroleum industry from a kerosine to gasoline business was in its initial stage.

Sohio had no crude production, no gathering lines or crude oil purchasing organization, and no pipe lines.

Yet it was serving a very high percentage of Ohio consumers.

Then began the struggle which is still going on to make enough money and borrow enough money to expand and integrate its facilities to meet the ever-growing needs of its customers within the limited area of the single state which it serves.

First it had to expand and modernize its refining capacity to assure itself of the necessary quantity and quality of products.

Then it had to free itself from reliance upon intermediate crude-oil purchasing companies and make direct connections with oil producers in the oil fields and put in gathering lines to take their oil. The opening of the new oil fields in Illinois in 1935 and 1936 afforded this opportunity.

Then it was necessary to build pipe lines from these gathering lines to the refineries.

All this took tremendous capital, and it was not until the latter part of 1942 that the company was able to muster the resources to begin to build up its own crude-oil production. This was a long and difficult course of progress, dependent fundamentally upon the generation of necessary capital through the operation of its marketing and refining business.

In the 5-year period between 1944 and 1948 the company put $117,817,000 into replacement and expansion of plant facilities, $47,041,000 into working capital, $1,061,000 into other investments, and $4,274,000 into retirement of stock and financing costs.

*(Continued on page 118)*

***WORKING DIRECTORS.**—The seven members of the Ohio Standard board, all of them active in company affairs, are shown here. Left to right are E. D. Wallace, vice president in charge of production; S. H. Elliott, vice president, transportation; A. A. Stambaugh, vice president, sales; C. T. Foster, president; W. T. Holliday, chairman of the board; E. B. McConnell, vice president, manufacturing; and W. A. McAfee, general counsel.*

# EASTERN

## New T.C.C. Units

### Socony-Vacuum replacing units at three refineries

SOCONY-VACUUM OIL CO., INC., has announced plans for construction of three additional 15,000-bbl. cracking units of the new modified Thermofor catalytic cracking process recently developed in the company's Paulsboro research laboratories.

The new units will be located at the company's refineries at Buffalo and Brooklyn, N. Y., and the affiliated Magnolia Petroleum Co.'s Beaumont, Tex., refinery.

Each of the new units will replace an existing 10,000-bbl. Houdry fixed-bed catalytic unit, thus increasing cracking capacities 50 per cent. Last summer the company announced plans for four similar T.C.C. units, also replacing Houdry facilities, at Trenton, Mich., Augusta, Kans., and Beaumont. Construction has begun at Trenton and Beaumont and bids have been asked for the Augusta job.

All of the seven new T.C.C. units so far announced are scheduled for completion this year. In the aggregate, they represent 105,000 bbl. in new cracking capacity, replacing 70,000 bbl. in Houdry facilities. This will leave the company, a pioneer in the original catalytic cracking process (Houdry), with only three remaining Houdry installations — at Paulsboro, N. J., East St. Louis, Ill., and East Chicago, Ind. The program will raise T.C.C. capacity to the neighborhood of 192,000 bbl. daily, including units in refineries of affiliated General Petroleum Corp. and Magnolia Petroleum Co.

The new version of the T.C.C. process developed by Socony-Vacuum incorporates improved and simplified design features which, the company states, will substantially reduce investment and operating costs and at the same time increase flexibility. Little information relating to design features of the new process has been released to date, but replacement of the mechanical method for lifting catalyst is understood to represent a prominent modification.

In addition to the seven units slated for Socony-Vacuum refineries, Standard Oil Co. (Ohio) has contracted for two units at Cleveland.

# GULF COAST

## Florida Gets 12th Well

HOUSTON.—A 12th producing well in Florida's only oil field has been completed by Humble Oil & Refining Co. for a potential of 413.76 bbl. daily.

The new producer is one of the best brought in during the 6-year history of Sunniland field which is in Collier County at the southern tip of the state. The well, Humble's B-4 Lee Tidewater Cypress Lumber Co., is bottomed at 11,576 ft. and is producing from open hole with 5½-in. casing set at 11,532½ ft. On its 20-hour potential through a 5/32-in. choke, the well made 434 M.c.f. of gas for a gas-oil ratio of 105 to 1. Tubing pressure was 734 psi. and gravity of the oil was 26.4°.

Sunniland field is currently producing around 950 bbl. daily from 11 wells—a per well average of 86 bbl.

## Competitive Bidding Asked

BATON ROUGE.—In a public resolution, the Louisiana State Mineral Board has urged the United States to require competitive bidding on any federal lands leased for oil development.

At present the Department of the Interior requires competitive bids on tracts containing known oil-bearing structures, but not on untested acreage. In its resolution, the Louisiana group said that failure to follow its recommendation "will result in the loss of a substantial revenue to the United States and in a loss to respective states which are entitled to participate in such revenues."

It also said that Louisiana had been receiving "materially greater bonuses" for its lands under competitive bidding than the government has for similar acreage without competitive bidding.

## Crude-Price Adjustment

HOUSTON. — Pan American Production Co. last week reduced the price it pays for heavy crude in five fields by including these heavier crudes in its gravity schedule.

The company previously paid $1.95 for crude of 20° gravity and below. Under the new schedule it purchases crude of 19° to 19.9° for $1.93, with a 4-cent differential per degree of gravity down to $1.61 for 12° and below. Fields affected are Cayuga, Manziel, Merigale-Paul, and Quitman (Eagle Ford and sub-Clarksville sands).

A company announcement said the adjustment was necessary "to bring the price of these crudes . . . more nearly in line with their true value in relation to the products manufactured therefrom."

## Measurement-Rule Hearing

JACKSON. — Consideration and adoption of a statewide rule facilitating the accurate measuring of oil from individual wells is on the docket for the January 19 public meeting of the Mississippi State Oil and Gas Board.

The board plans to study the accurate measuring of oil from individual wells where the wells are being emptied into tank batteries along with other wells on the same lease. Testimony has been requested as to the necessity or advisability of requiring separate storage tanks for each producing well and suggested methods for practical determination of the production of oil from each producing unit.

*NOT THE GULF.—The expanse of water shown here is crossed by miles of catwalks connecting producing wells. Scene is Hackberry field in Black Lake, which lies in the middle of the Louisiana marsh land. In the foreground is one of the many storage tanks which surround the lake. Wells in the background are those of Stanolind Oil & Gas Co.*

LATIN AMERICA

# Peru's Petroleum Law

## Proposed legislation found favorable by United States companies; royalty to vary for three geographical areas

Dahl M. Duff

THE proposed new petroleum law drafted by a Peruvian Government commission has met a generally favorable reaction from the industry, and it is expected that concessions will be applied for, particularly in the coastal region, if it is enacted.

The draft was recently circulated for comment among representatives of oil companies which have indicated an interest in Peruvian operations. It is likely that Brig. Gen. Don Manuel Odria, head of the military-junta Peruvian Government, will make the new law effective in the near future.

There seems to be no serious question as to the validity of a decree law in the case of Peru. The government is a recognized de facto regime, and the past record in Peru indicates its acts will be honored by any strictly constitutional government that may follow.

The proposed law repeals Peru's present antiquated oil legislation. Royalty specified for exploitation concessions is 12 per cent in the coastal zone, 6 per cent in the Sierra or mountain zone, and 3 per cent in the trans-Andean Oriente.

Completion of the draft and apparent preparations to promulgate the law soon follow about 5 years of intermittent discussion and controversy in Peru over development of the petroleum industry. Shortly after the war several companies indicated they were ready to make major investments provided satisfactory legislation was enacted. Some of these are still interested but not on the same scale as formerly. Developing and transporting oil out of the difficult trans-Andean region requires an investment estimated at more than $200,000,000, and investment plans have been carried out elsewhere.

**Exploration leasing.**—Exploration concessions provided in the proposed law would be of 4 years' duration in the coastal zone with a possible 2-year extension, 5 years in the Sierra with a possible 4-year extension, and 6 years in the Oriente with a possible 5-year extension. Maximum concession area is 60,000 hectares, 80,000 hectares, and 200,000 hectares in the three zones respectively.

All applications for the Sierra and Oriente within 6 months after the law is promulgated will be considered as having been filed the same day. Thus, these applicants will be asked to submit bids with the highest offer receiving consideration.

A concession holder may obtain any number of concessions, and any oil found during exploration may be used in operations. Applications for exploration concessions in general are to be decided in 30 days and, if no opposition is met, granted within the next 53 days. No concessions are given within 50 km. of the national frontiers.

**Exploitation plans.**—The exploitation section of the draft law gives the government the right to select and retain from the exploration area, 25 hectares of each concession of 1,000 hectares or more. This 25 hectares becomes a part of the free area or national reserve. The area of the exploration concession retained for exploitation cannot be more than 50 per cent. The government is obligated to grant exploitation concessions derived from exploration concessions.

Duration of exploitation concessions is 40 years with a possible 10-year extension for the coastal zone, 45 years for the Sierra with a possible 15-year extension, and 50 years for the Oriente with a possible 25-year extension. Maximum areas for the three zones are, respectively, 30,000 hectares, 40,000 hectares, and 100,000 hectares.

Areas reserved to the state from abandoned concessions or conversion become free areas, and exploitation concessions on these are granted to the highest bidder with preference in case of equal bids given to the original exploration concessionaire. National reserves are composed of selected free areas and the Zocalo Maritimo zone. These national reserves are to be developed by contract between company and government with rights granted to the party making the offer considered most advantageous to the state.

Any concession may be surrendered at any time. They are subject to revocation on failure to pay taxes, royalties or to carry out the appropriate program actively. In the exploitation stage, the concessionaire has the right but not the obligation to refine and transport. Another article stipulates that national requirements, including defense, must be met before oil can be exported, and the price of domestic petroleum is fixed by the government.

**Concession taxes.**—The proposed law sets out the various taxes to be levied on the industry. Peru in mid-November revalued its currency and abolished the old official rate of 6.50 sols to the dollar. Free-market rate of the sol is about 5 cents. At the same time, the government discontinued its practice of sharing in foreign currency derived from exports. The action removed some of the exchange restrictions which had been hampering present operators in Peru.

Under the draft law, for the three zones, coastal, Sierra, and Oriente, annual exploration surface tax per hectare per year is 2 sols, 1 sol, and 0.2 sol. The exploitation and free-area surface tax begins at 5 sols per hectare per year, increasing 5 sols in each succeeding 5-year period to 25 sols. In the Sierra the tax is 50 per cent of that in the coastal zone, and in the Oriente, 25 per cent of the coastal-zone tax.

There is also an initial tax on exploitation and free-area concessions of 25 sols in the coastal zone, 50 per cent of this in the Sierra, and 25 per cent in the Oriente. Transportation-concession holders pay a tax of not more than 5 per cent of receipts but exploitation concessionaires transporting their own products are not taxed in this respect. Concessionaires pay all general taxes, including those imposed on utilities.

**Miscellaneous requirements.**—Companies are required to use at least 80 per cent Peruvian technical personnel if available. Another article provides that 25 per cent of stock and 30 per cent of the directors of new companies must be Peruvian. Concessionaires are required to submit any information on operations which may be requested by the government's Petroleum Board. Concessionaires have the right of using materials found on the concession in their operations, of demanding rights-of-way, and of importing at 50 per cent duty into the Oriente. Royalties from the set rates can be reduced if it is satisfactorily shown that all costs have risen so as to make the operation uneconomic.

Three large international companies, Standard Oil Co. (N. J.), Socony-Vacuum Oil Co., Inc., and Shell carried on preliminary exploration in Peru shortly after the war. Standard Oil Co. of California also is reported to be interested in the prospects in Peru. Another possible applicant for Peruvian concessions is Conorado Petroleum Corp. (Continental, Ohio Oil, and Amerada).

# 1949 in Venezuela

## Record production rates, expansion of refining capacity, and discovery of eight fields make an outstanding year

PRODUCTION records by the two largest operators, at least eight new field discoveries, and an extensive refinery construction program make the year 1949 an outstanding period for the petroleum industry in Venezuela.

Despite a temporary slump in production caused by a drop in demand for oil products and two brief works stoppages in the western region, the record for the first 11 months shows that Venezuela maintained its position as the second largest oil-producing nation during the year.

The continued leading position of Venezuela in world oil activities was discussed in an article prepared recently for El Farol, the Spanish magazine of Creole Petroleum Corp. It reviewed outstanding developments of 1949 in the Venezuelan oil industry.

Uncertain demand and low prices forced companies to curtail exploration activities during the year, but more oil was found than was taken out of the ground. A number of wildcats were successful, and exploitation wells helped increase proved reserves.

Production averaged 1,308,392 bbl. daily for the year through the week ended November 21, compared with an average of 1,339,000 bbl. daily in 1948, which was a record year, El Farol said. Production dropped to a low of about 1,030,000 bbl. daily in February, but by the end of November was running well above the 1948 average. For the week ended November 21, the industry produced an average of 1,476,009 bbl. daily, an all-time record.

**Field discoveries.**—Although it actually tested as a producer late in 1948, Shell Caribbean Co.'s discovery well at Sibucara, 9 km. west of Maracaibo, proved itself as an outstanding producer this year. The well has produced between 8,000 and 10,000 bbl. daily of 37° A.P.I. gravity oil this year from deep Cretaceous formations. It is outstanding not only because of the high-quality oil but also for the volume of production.

Another important field discovery was made jointly by Atlantic Refining Co. and Pancoastal Oil Co. in Distrito Infante, State of Guarico, about 18 km. south of Valle de la Pascua. Called Ruiz field, eight wells had been drilled late in 1949. Potential was 4,500 bbl. daily. The oil is about 28° gravity, and no dry holes have yet been drilled.

Other field discoveries in 1949, which have yet to be developed before their extent can be determined, include:

Freites (Creole), Distrito Freites, Anzoategui, 20 km. southeast of Cantaura, about 32° gravity oil.

Abundancia No. 1 (Creole) in Distrito Acosta, eastern Falcon, about 24° gravity.

Mapiri (Mene Grande Oil Co.) also in Distrito Freites, Anzoategui, about 15 km. southwest of Cantaura, about 30° gravity.

Piragua (S.A.P. Las Mercedes), about 35 km. southwest of Las Mercedes field in Guarico, about 41° gravity.

San Roque (Phillips Oil Co.), about 18 km. southwest of Santa Ana field, Distrito Aragua, Anzoategui, 36° to 48° gravity, seven wells on production.

Moriche (Socony-Vacuum Oil Co. of Venezuela), 10 km. southwest of Chimiri field, Distrito Freites, Anzoategui, 33° to 37° gravity.

Although there were other successful exploratory wells, El Farol said, these were considered the most promising. It is interesting to note that most of them found relatively high-gravity oil which is much sought after to balance Venezuela's historically large output of heavy-gravity crude.

Successful exploitation drilling extended the potential reserves of Bolivar Coastal field and Mara. Deep wells were relatively common in Venezuela during the year. Shell's CT-1 in southern Zulia was drilled to 15,637 ft. and holds the South American depth record.

Other developments during 1949 were:

**Production.** — Both Shell and Creole set all-time production records. Shell went over the 500,000 bbl. daily mark for the first time in its history in August due largely to successful exploitation of Cretaceous production in La Paz, Mara, and Sibucara. Creole reached a new all-time high of 664,587 bbl. daily for the week ended October 31. (These figures refer to operated production and differ from the leasehold production statistics issued by the Venezuelan Government.)

**Conservation.** — Creole and Pantepec Oil Co. inaugurated the Bs. 18,000,000 ($5,400,000) crude stabilization and repressuring plant at Mulata, Monagas, early in the year. It is designed not only to utilize natural gas to prolong the life of oil formations in that area, but also to use gas to improve the quality of the crude. Venezuelan Oil Concessions, Ltd. (Shell), was building a gas absorption plant in La Paz to extract gasoline from natural gas.

**Refining.** — Venezuelan refining capacity was increased by 55,000 bbl. daily with the inauguration early in the year of the Shell refinery at Punta Cardon, Paraguana Peninsula. The Creole refinery, also in Paraguana, will go on stream early in 1950 with a capacity of 60,000 bbl. daily. Venezuelan Gulf Refining Co. was building another refinery at Puerto La Cruz with a capacity of 30,000 bbl. daily, expected to go into operation by mid-1950.

**Pipe lines.**—The only oil pipe line of note completed this year was the 40-km., 18-in. line from Richmond Exploration Co.'s Boscan field in Zulia to Bajo Grande on the west shore of Lake Maracaibo. Two other companies, however, are active with the government in the initiation of what will be one of the largest water pipe lines in the country. A three-way agreement was formally announced between Creole, Shell, and the national government covering construction of a water line from Siburua Springs, south of Coro, to the Paraguana Peninsula. Wells in Siburua were nearly completed and clearing the right-of-way for the line was started. The pipe line will carry more than 300,000 bbl. of water daily, not only for use of the Shell and Creole refineries but also for the inhabitants of the arid region.

Shell and Creole also made considerable progress on the plan to construct a products pipe line from Catia la Mar to Caracas. This line will be completed in 1950. Rising from near sea level to more than 3,000 ft. in some 15 miles, it will be one of the steepest pipe lines in the world.

**Financial.**—Despite climbing production in the second half of the year, oil companies expected their profits to be about 30 per cent less than last year because they were getting less money per barrel.

## Mexico Speeds Drilling

A program calling for drilling more than 300 wells in 1950 in an effort to increase production in Mexico to 250,000 bbl. daily has been set up by Petroleos Mexicanos.

Antonio J. Bermudez, Pemex director, said recently in Mexico City, that the organization expects to continue an expanded drilling program to raise production to 350,000 bbl. daily by 1952 when the present national administration leaves office.

Mexican production in September was slightly more than 170,000 bbl. daily. According to Bermudez' announcement, 180 wells were drilled in 1949 against 83 in 1948 and 51 in 1947.

In his discussion of the Mexican oil industry Bermudez said that reserves were estimated at 1,050,000,000 bbl. in 1946 and have since been increased to 1,850,000,000 based on discoveries in northeastern Mexico.

The second well to be drilled by

# PROTECT GASOLINE VOLATILITY

## by storing it in tanks equipped with the Horton* Double-Deck Floating Roof

The motorist who buys your gasoline this winter wants to hear a satisfying purr when he presses the starter button. He probably won't unless you protect the 10 per cent point of that gasoline during storage.

As an oil man, you know that the 10 per cent distillation temperature of gasoline must be low enough to allow sufficient vaporization to start a cold engine. But when you lose gasoline through evaporation, that temperature is raised. For example, a volumetric loss of 1.0 per cent is accompanied by a rise in the 10 per cent point of about 5 degrees. When you permit excessive evaporation losses, users of your gasoline will have difficulty with starting in cold weather.

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*Trademark registered in U.S. Patent Office

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Atlanta, 3.....2154 Healey Bldg.
Birmingham, 1.....1536 North 50th St.
Boston, 10.....1025—201 Devonshire St.
Chicago, 4.....2128 McCormick Bldg.
Cleveland, 15.....2204 Guildhall Bldg.
Detroit, 26.....1514 Lafayette Bldg.
Havana.....402 Abreu Bldg.
Houston, 2.....2119 National Standard Bldg.
Los Angeles, 14.....1523 General Petroleum Bldg.
New York, 6.....3347—165 Broadway Bldg.
Philadelphia, 3...1615—1700 Walnut Street Bldg.
Salt Lake City, 1..1525 First Security Bank Bldg.
San Francisco, 11..1254—22 Battery Street Bldg.
Seattle, 1.....1325 Henry Bldg.
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Chicago Bridge & Iron Company, Ltd., Apartado 1348, Caracas, Venezuela
Compagnia Tecnica Industrie Petroli, Rome, Italy
Whessoe, Limited, Darlington, England
Motherwell Bridge & Engineering Company, Limited, Motherwell, Scotland
Comprimo N.V., Amsterdam—O, Netherlands

Mexican American Independent Oil Co. (CIMA) is located about 25 km. south of Ciudad del Carmen in the State of Campeche. At last report, it was below 1,500 ft. This well, 1 Xicalango, was described by Bermudez as a complete wildcat 241 km. from the nearest producing field. CIMA's first well, 1 Tortuguero, made successful production tests.

Wells 4 and 5 are now being drilled in the northeastern Mexican coastal area under the financial and technical-assistance agreement between Cities Service Oil Co. and Pemex. Three nonproductive wells have been completed, and exploratory drilling is continuing in scattered sections of the area.

Bearing out the Mexico City reports of a much expanded Pemex drilling program for 1950, information recently current in New York said the agency has recently made arrangements for the purchase of 10 additional drilling rigs.

# Trinidad Expansion

## Major producer adds rigs, will make petrochemicals

TRINIDAD LEASEHOLDS, LTD., is placing in operation three new heavy rigs to speed up deep drilling operations, has decided on an extensive refinery-modernization program, and has entered into petroleum-based chemical manufacture in partnership with Universal Oil Products Co.

These and other developments were discussed in the company's recent report covering operations and other activities for the year ended last June 30. Trinidad Leaseholds is the major producer on the British West Indies island.

**Drilling activity.**—The company's production during the year was 6,130,900 bbl. with an additional 9,824,300 bbl. purchased and from joint fields. Comparable figures for the 1948 year were 6,172,600 and 8,446,900 bbl. Footage drilled last year in the company's own fields was 114,595 ft. against 156,853 ft. the previous year.

The new rigs, Board Chairman Simon J. Vos said, should make profitable the development of deeper oil sands. The first of these new rigs is in operation, the second is rigging up, and the third should be in use by the end of this year.

Development by the company's staff of an oil-base mud particularly suitable for some formations in the island has facilitated drilling. The Clark Road well at 10,087 ft. is the deepest producer in Trinidad. This well was successfully redrilled after a casing collapse early this year, and in the last 2 months of the fiscal year produced 25,000 bbl. Vos said the company hopes to show some increase in reserves by further drilling in this region. Work continues in the Guayaguayare area but commercial production has not been attained. The company is drilling a second test in the Upper Cretaceous at Beach field.

During the coming year, the chairman said, a deep test in the northern part of the island will be undertaken by Trinidad Northern Areas, Ltd. Trinidad Leaseholds has taken over the management of this company in which it holds one-third interest with United British Oilfields of Trinidad, Ltd., and D'Arcy Exploration Co., Ltd.

A joint company is being formed with Central Mining & Investment Corp., Ltd., and British Union Oil Co., Ltd., to explore in the Barbados. Preliminary surveys have been completed, and an application will be made for a concession if legislation proposed by the Government of Barbados is enacted. Vos said this law would make possible the heavy expenditures necessary.

**Refinery modernization.**—Vos pointed out that the company's recent duty-exemption agreement with the Trinidad Government enables the company to make long-term contracts for processing imported crudes and also justifies the refinery-improvement plans. During last year, Trinidad Leaseholds refined for its own account 14,194,600 bbl. as compared to 13,951,400 bbl. the previous year. The most important part of the modernization plan is a 15,000-bbl. daily catalytic cracking plant with attendant vacuum-distillation column for feed preparation, expected to go in operation in 1952.

"When the new plant is in use, not only will we have ample cracking capacity, but also will be able to make petrol to meet any likely gasoline specifications required by the market anywhere in the world," Vos said. "To the extent that gasoline of the highest grade is not needed then the gasoline from this plant can be equally profitably utilized by taking advantage of its quality for blending up gasoline of lower grade, thus avoiding reforming. . . .

"It is expected that nearly all the equipment needed for this refinery extension can be purchased in this country, and that our dollar requirements will be therefore reduced to a minimum."

To carry out the arrangement with U.O.P. for manufacture of chemicals from Trinidad petroleum, operating and sales companies have been registered under the name "Tricana," Vos said. The manufacturing company is Tricana Industrial Chemicals, Ltd., which together with the Canadian sales company Tricana of Canada, Ltd., is registered in Toronto. Tricana, Ltd., is the United Kingdom marketing company. The first product developed is a hydrocarbon oil which can be converted into soapless detergents, and some refinery equipment in Trinidad has been converted to its manufacture. Other projects are under development in the chemical field.

As a result of the difficulties of British companies operating in nonsterling areas such as Venezuela, the North Venezuelan Petroleum Co.'s board has recently decided to sell its interests to Creole Petroleum Corp. North Venezuelan, in which Trinidad Leaseholds is interested, holds a government concession over 2,000 sq. miles in the State of Falcon in Venezuela on which Creole has been the operating company.

## Mexican Refineries

Petroleos Mexicanos expects to have in operation by next July or August a 5,000-bbl. per day refinery at Reynosa.

Most of the plant equipment will consist of facilities at the Bela Vista refinery near Tampico which are being dismantled and moved to Reynosa. Some additional equipment to modernize and expand the plant will be purchased in the United States.

The Reynosa refinery will be located on the Reynosa-Matamoros highway between the oil field and the railroad track.

The $25,000,000 Pemex refinery at Salamanca, one of the organization's major projects, is scheduled to be in operation in March but at a restricted rate, depending on later completion of a 12¾-in. pipe line from Poza Rica field.

About 62 miles of this 280-mile line has been completed. Work is proceeding with about 30 miles being laid each month. Some difficulty has been experienced in pipe shipments from Mexican manufacturers, so 62 miles of pipe was ordered from a United States company to speed completion of the project.

## Creole Operations

Both daily average production and the average number of rigs in operation by Creole Petroleum Corp. declined in November, according to the company's monthly report.

Production averaged 621,301 bbl. daily, down 16,939 bbl. daily from October, with most of the decrease in Eastern Venezuelan output. Runs at Caripito were 60,430 bbl. daily and at La Salina, 18,037 bbl. daily.

Rigs operating averaged 12.2 in November compared to an average of 13 the previous month. Seven producing field wells were completed, and no exploratory wells.

Also of interest in connection with

Venezuelan activities was the recent twenty-fifth anniversary of production in the oldest well operated by Creole. It is the LR-3 in La Rosa field in Western Venezuela, completed in 1924 and still producing 26 bbl. daily, with a cumulative production of 429,660 bbl. since that time.

Another production anniversary was marked by LL-370 in Lagunillas field. This record Creole well has produced more than 10,000,000 bbl. in its 10 years of existence and now averages about 2,700 bbl. daily.

## EUROPE

# British-Ban Difficulties

### American firms find it impossible to halt sterling-area imports immediately; crude supply for Japan raises issue

**Dahl M. Duff**

PHYSICAL and technical difficulties have prevented American companies from immediately halting fuel oil imports into the United Kingdom as called for by new British Government policy.

A source in New York last week said the British had recognized the problems involved in putting tankers in position and related matters. This, he said, is the only modification of the British plan to eliminate all dollar fuel oil and curtail dollar gasoline by one-third after January 1 in favor of surplus sterling supplies.

Fuel-oil allotments are provided to about February 15, and in the case of gasoline, for about 2 months of the quarter. It was indicated the importing American companies will buy products from sterling suppliers for the remainder of the quarter, with their course beyond that point not yet determined.

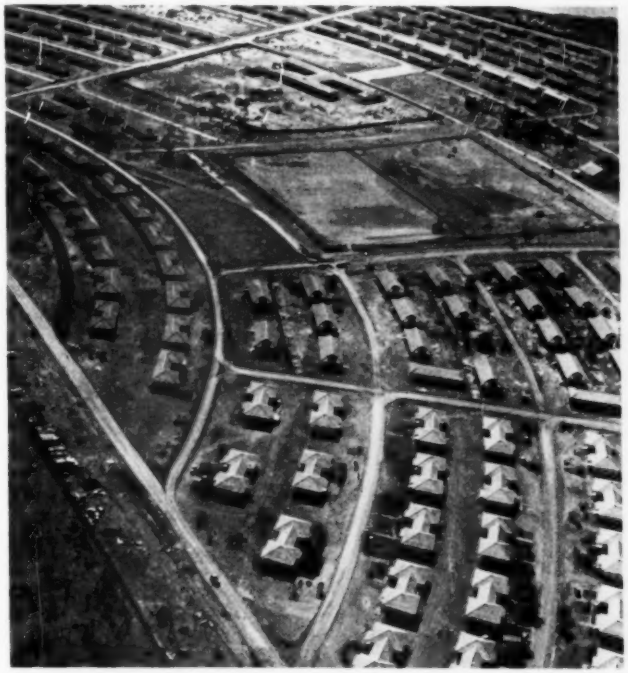
Oil officials looked to Washington for some solution which would avoid such drastic and probably progressive elimination of American-produced oil from sterling area markets. A report from Washington said the Economic Cooperation Administration had decided against financing any new British refinery projects until the country's long-range plans are clarified. However, it was pointed out that this has been ECA's position for several months and that the Washington talks are being held for that purpose.

**Problem in Japan.**—The other aspect of the sterling-dollar oil conflict that continued to attract interest involved the situation in Japan. American sources pointed out that Japan is outside the sterling area and declared that British restrictions on sterling accumulated by Japan show the British intention to take advantage of present currency dislocations to obtain a dominating position in world trade.

On the other hand, British trade circles in Toyko complained that American oil companies are trying to keep British oil out of Japan while they continue to meet Japanese requirements at the expense of the American taxpayer. They said that American oil-company pressure caused the disqualification of British-offered sterling oil from Kuwait on the "technicality" that its sulfur content was excessive.

It was reported that an American trading company, U. S. Foreign Corp., headed by Frederick Richmond, had been awarded the 4,000,000-bbl. contract to supply crude with payment in sterling but that the arrangement was cancelled after the British Exchange Control notified Allied Supreme Headquarters in Japan that the sterling could be used only to purchase Japanese goods for export to the sterling area. U. S. Foreign Corp. presumably would recover dollars spent for the crude by buying Japanese goods for sterling and exporting them to dollar markets.

As an interim measure, Allied authorities arranged for the purchase of 960,000 bbl. of crude from Union Oil Co. of California, and it is expected that an award for further requirements will be made in the near future. A British expert was reported to be flying to Japan to try to convince the Japanese that the sulfur content of the crude offered was not excessive.



*ONE THOUSAND HOMES.—An aerial view of part of a 1,000-home community constructed by Shell Co. of Venezuela, Ltd., at its Punta Cardon refinery is shown in this photograph. The residential area is laid out in a 1,480-acre tract with wide curving streets and ample room for parks and gardens. Shopping-center facilities have been provided to serve 12,000 people, and include churches, a theater, restaurants, markets, beauty shops, a post office, and a hospital as well as sports areas such as playing fields and bathing beaches. The large hospital will have a staff of 15 doctors*

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## In New Job

### Harold Decker takes over as Houston Oil president

HAROLD DECKER, Houston, formerly vice president, general manager, and a director of Pan American Production Co. and Pan American Gas Co., has assumed his new duties as president and director of Houston Oil Co. and Houston Pipe Line Co.

Decker was elected president of the two firms in December, succeeding the late George A. Hill, Jr.

After attending Kenyon College at Gambier, Ohio, Decker entered the University of Oklahoma, where he majored in petroleum engineering. He first entered the oil business in 1925 when he joined Rio Bravo Oil Co.

Later he went with Seaboard Oil Co., and served as district superintendent at Corpus Christi. Joining Pan American in 1945, he was named assistant manager, and in 1947 was named vice president.

During the past year Decker attended the advanced management program of the Harvard University Graduate School of Business Administration. He is a member of Sigma Alpha Epsilon fraternity, the American Petroleum Institute, the American Institute of Mining and Metallurgical Engineers, and is a registered engineer in Texas. He will take office as a national director of the A.I.M.E. this year.

**C. S. Rose,** who in November was named superintendent of production for Sinclair Oil & Gas Co.'s Oklahoma division, has taken up his new duties in Oklahoma City, after transferring from Midland, Tex. **R. F. Higginbotham,** formerly assistant superintendent at Jackson, Miss., has transferred to Gainesville, Tex., as district superintendent.

**W. P. Lawrence,** seismograph party chief for Amerada Petroleum Corp., in the San Angelo, Tex., area, has been moved to the Big Spring, Tex., area in the same capacity, and **Albert E. Benson,** party chief at Casper, Wyo., has been transferred to Blackwell, Okla.

**Charles R. Wheeler,** Glendale, Calif., has been named Pacific Coast field-service representative for the Pennsylvania Grade Crude Oil Association, succeeding **E. H. Fallin,** Los Angeles, who resigned to join the National Petroleum Association in Washington, D. C.

**M. P. Appleby** has resigned as director, vice president, and treasurer of Wilcox Oil Co., Tulsa, and will enter the independent producing field. **Carl L. Miller,** secretary and assistant treasurer for Wilcox, was named secretary and treasurer by the board of directors. **A. L. Chapman,** head of the lease department, has been named vice president of that department, and **Bert E. Lane,** who has been assistant secretary, was named assistant secretary and treasurer.

**T. Preston Ware, Jr.,** district geologist for Herman and George Brown of Houston, has opened his own consulting geological offices in Corpus Christi's Jones Building. Prior to joining the Brown organization he was geologist for Baldridge & King in McAllen, Tex. He is a graduate of Louisiana State University.

**W. Anthony Newhoff,** San Francisco, vice president of Union Oil Co. of California, has been elected a director of the Central Valley Bank of California.

**Wade G. Moriarty,** Magnolia Petroleum Co., has been transferred from the Salem, Ill., producing district to the Brownfield, Tex., district, as production superintendent, and **Harvey Lee,** formerly production superintendent at Brownfield, has been moved to Salem as production superintendent. The company announced that **John Rice Guynes** has been advanced to assistant purchasing agent, succeeding **B. T. Adkerson,** who has retired after more than 39 years of company service.

**L. J. Goodwin,** formerly district land man for Standard Oil Co. of Texas at San Antonio, has been named division land man for the company's southern exploration division.

**E. J. Jameson,** Tulsa, has been named assistant manager of the material and traffic department for Carter Oil Co. He has been with the company since 1939.

**Lowell E. Ullery,** vice president of Chase National Bank, New York, has been appointed executive head of the petroleum department of the bank. He succeeds **Joseph E. Pogue** who recently became a director of Gulf Oil Corp. but remains a petroleum consultant to the bank and retains his office there.

**Thomas B. Kimball** has been appointed assistant manager of refineries for Sinclair Refining Co., New York City. He has been with the company since 1923, following his graduation from the University of California with a B.S. degree in chemical engineering, and served in the research and development department at East Chicago, Ind., before his transfer to New York in 1943. At East Chicago he was in charge of the cracking division and of process engineering and development of light-oil processes. When transferred to New York he was made technical assistant to the vice president of manufacturing. During the past several years he has developed numerous patents on light-oil treating and on thermal and catalytic cracking.

**Thomas Wayland Kidd,** area petroleum engineer at Crane, Tex., for Gulf Oil Corp., has been named assistant zone petroleum engineer for the firm at Odessa, Tex.

**Robert E. Vickrey,** field superintendent at Carthage, Tex., for Sun Oil Co., has been transferred to Dallas as gas-measurement superintendent.

**Arnold F. Burton,** gasoline-plant foreman at Shiprock, N. M., for Continental Oil Co., has been transferred to the Todd Ranch gasoline plant at Big Lake, Tex., as operator in the process division.

**W. R. Bryson,** mechanic in charge of drilling-equipment maintenance for Danciger Oil & Refining Co. at Natchez, Miss., has been transferred to Baton Rouge in the same capacity.

**Elliott Dingee,** until recently aviation adviser to the foreign-trade department of Socony-Vacuum Oil Co., Inc., in New York City, has been

# PERSONALS

made a member of the management staff in Istanbul, Turkey. **R. G. Coffin** assumes Dingee's duties and retains his position as manager of marine sales. **A. E. Noble,** formerly with Intava in London, is returning to the United States to assist Coffin on aviation matters.

**A. H. Fox,** Standard Oil Co. (Ind.), has been elected vice president of the Society of Automotive Engineers, representing the diesel engine activity of that group for 1950. He is group leader in charge of work on diesel fuel applications at Indiana Standard's research department. A graduate of Purdue University, Fox joined The Texas Co. (China), Ltd., as an engineer from 1928-36, and was located in the Mukden office when the Japanese took over Manchuria. He joined Standard of Indiana's research department in 1937 after obtaining his master's degree from Purdue, and has been active in the diesel fuels division of the Coordinating Research Council.

**M. J. Rathbone,** director of Standard Oil Co. (N. J.) and former president of Esso Standard Oil Co., has been named to head the 1950 triannual campaign for funds to finance the New Jersey State Safety Council.

**A. Glover,** drilling foreman for Shell Oil Co., has been transferred from the Midland, Tex., area to Franklin, La. Other changes include: **R. L. Davis,** gas engineer at Houston, moved to New Orleans; and **E. Steffenhagen,** exploitation engineer, transferred from Lake Charles, La., to Franklin in the same capacity.

**Robert W. Curry,** production engineer for the La Gloria Corp. at Falfurrias, Tex., has been transferred to the company's Corpus Christi offices.

**John G. Christel** has been named senior shift foreman in the pressure-distillation section, Esso Standard Oil Co.'s Bayway, N. J., refinery, succeeding **William Smith,** retired.

**L. Andrew,** formerly general superintendent of General Petroleum Co.'s pipe-line department, has been named manager of the department. He is succeeded by **V. C. Larsen. C. W. House** moves from superintendent of the northern division of the department to southern division and is succeeded by **H. T. Williams,** formerly his assistant.

**Ralph R. Denham, Jr.,** engineer at Oklahoma City for Stanolind Oil & Gas Co., has been transferred to Shreveport as reservoir and production engineer.

**A. E. Johnson,** formerly district foreman at Ellinwood, Kans., for Mid-Continent Petroleum Corp., is now assistant division superintendent at Wichita, supervising drilling and producing operations.

**Charles G. Faubion,** formerly party chief at Donaldsonville, La., for Atlantic Refining Co., has been transferred in the same capacity to Big Spring, Tex.

**T. W. Smith,** driller for J. R. Sharp Drilling Co. at Odessa, Tex., has joined Helmerich & Payne as a driller in the Southwest Maysville field of Oklahoma.

**Thornton Torvin,** tool pusher for Loffland Brothers Co. at Bay City, Tex., has been moved in the same capacity to Plaquemine, La.

**A. L. Snow** has been elected a vice president of California Research Corp., subsidiary of Standard Oil Co. of California, succeeding **J. N. Adams** who retired recently after 31 years of service. Snow also was appointed manager of the company's patent department, and **O. S. Loud** and **H. B. Wands, Jr.,** were named assistant managers.

**Robert L. Minckler,** president of General Petroleum Corp., Los Angeles, has been named chairman of a special committee on percentage depletion for Western Oil and Gas Association. Others on the committee include: **C. A. Johnson,** president, Holly Development Co., vice chairman; **L. L. Aubert,** president, Bankline Oil Co.; **William F. Humphrey,** president, Tide Water Associated Oil Co.; **Charles S. Jones,** president, Richfield Oil Corp.; **T. S. Petersen,** president, Standard Oil Co. of California; **C. P. Watson,** vice president, Seaboard Oil Co. of Delaware; and **W. C. Whaley,** vice president, Barnsdall Oil Co.

**Dr. Wendell P. Woodring,** geologist for U. S. Geological Survey, has been awarded the Penrose Medal of the Geological Society of America, for distinguished achievement in the geologic sciences. He is a graduate of Albright College, Myerstown, Pa., and received his Ph.D. degree from Johns Hopkins University in 1916.

**Ray W. Winters,** petroleum engineer for Richardson & Bass at Kermit, Tex., is now serving the firm as a geologist at Monahans, Tex.

**Roy J. Diwoky,** executive assistant to the president of Pan-Am Southern Corp., New Orleans, has been elected a vice president of the firm. He joined Pan American Petroleum Corp. last June and formerly was assistant general superintendent of the Whiting, Ind., refinery of Standard Oil Co. (Ind.). Diwoky became associated with Indiana Standard in 1935 and after 5 years of service in the research department was transferred to the manufacturing department, where he rose to the position of assistant general superintendent of the Whiting plant. Pan American Petroleum Corp. and Root Petroleum Co. merged into the Pan-Am Southern Corp. last summer.

**George Bertram** has been named superintendent of Shell Oil Co.'s cycling plant at Sheridan, Tex., succeeding **P. W. Beck,** who retired after 25 years of service. Bertram has been with the company 17 years and formerly was at the Norco, La., refinery where he was assistant manager of the cracking department.

*Maj. Gen. Laurence S. Kuter, left, commander of the Military Air Transport Service, presents a certificate of appreciation, signed by W. Stuart Symington, secretary of the Air Force, to Scott E. Drummond of New York City, chief of construction and maintenance for Esso Standard Oil Co., for his wartime assistance to the Air Transport Command in establishing aviation-fuel servicing facilities across the continent of Africa.*

**C. E. Bradford,** superintendent at Casper, Wyo., for Herman and George Brown, has been transferred to Midland, Tex., in the same capacity.

**Emil J. Jandacek** has been named assistant chief engineer for Texas Gas Transmission Corp.'s entire pipe-line system, and will be headquartered in Owensboro, Ky. Jandacek has served for 8 years in various engineering capacities with Stone & Webster Engineering Corp., and for the past several months he was assigned by that organization to the compressor station construction program under way along the route of Texas Gas' 800-mile natural-gas pipe line. Jandacek is a graduate of University of Wisconsin with a B.S. degree in civil engineering.

**Ed Wrangle,** Seminole, Okla., has been named superintendent of Cities Service Oil Co.'s new Chico, Tex., gasoline plant. He has been with the firm since 1927 and transfers from the company's Sasakwa plant in the Seminole field. **E. B. Lord,** Seminole, will supervise both the Maud and Sasakwa plants, with **Lonnie Pitts** handling direction of Sasakwa plant operations as assistant superintendent. Lord and Pitts both have more than 20 years' service with the company.

**George W. Petty,** Houston, formerly with Texas Pipe Line Co., has been appointed head of the land department for Montana-Dakota Utilities Co., Minneapolis, with headquarters in Glendive, Mont. He served as forecasting engineer on the War Emergency Pipe Line, Inc., "Big Inch" line in Cincinnati during World War II, and at the end of the war joined Scurlock Oil Co. as pipe-line superintendent in Southwest Texas.

**J. J. Leu** has been elected vice president of the services and operations department of American Oil Co., New York City, and **Marc I. Schwartz** has been elected vice president in charge of sales.

**Fred G. McAlister,** former mayor of London, Ont., and actively connected with the petroleum industry, has been named a director of Reliance Petroleum, Ltd., of London.

**F. V. Cook,** master mechanic for Stanolind Pipe Line Co., Tulsa, will assist the Trans-Arabian Pipe Line Co. in preparing an operating and maintenance manual for their mechanical equipment. He is to spend 3 months in San Francisco on this assignment.

**Harrold E. Wright,** production engineer for the Southwest Texas district, Hiawatha Oil & Gas Co., with headquarters at Benavides, has been transferred to the West Texas district, Midland, as district engineer. He is a 1944 engineering graduate of Texas Technological College, Lubbock, and is a registered professional engineer in Texas. Before joining Hiawatha in 1948 Wright served as resident engineer in the East Texas area for Freese & Nichols, Fort Worth.

**Virgil Haney,** formerly district landman for Tide Water Associated Oil Co., Corpus Christi, has resigned to become an independent in that city.

**Gov. Allan Shivers** of Texas has been named chairman of the Southern Governors Association tidelands committee. He succeeds the late Gov. Beauford H. Jester in the position.

**Harry W. Hitt,** Seaboard Oil Co. of Delaware, Midland, Tex., has been transferred to the firm's subdistrict office at Abilene, Tex., as land man.

**J. B. Kennedy** has been placed in charge of a new district headquarters in Hammond, La., of the Texas Pacific Coal & Oil Co. His assistant will be **W. H. Warren.** Texas Pacific formerly maintained southeast district offices in Jackson, Miss.

## SHIFTS

**Thomas V. Sheehan,** engineer, Standard Oil Co. (Ind.), Hampton Bay to Brooklyn, N. Y.; **J. H. Loeb,** engineer, Wichita to Centralia, Ill.; **Robert R. Smart,** geologist, General Petroleum Corp., Vernal, Utah, to Durango, Colo.; **Jean F. DeChadenedes,** geologist, Stanolind Oil & Gas Co., Casper, Wyo., to Memlo Park, Calif.; **Alfred W. Vitt,** engineer, Seaboard Oil Co. of Delaware, Pasadena, Calif., to Casper, Wyo.; **Leo B. Agers,** engineer, Magnolia Petroleum Co., Cement to Ninnekah, Okla.

# DEATHS

**Francis Coryell,** 46, Tulsa, director of research for Interstate Oil Pipe Line Co., died January 6. A native of New York City, Coryell had been with Standard Oil Co. (N. J.), parent company, since 1928 and from 1928 to 1943 he served as master mechanic in the pipe-line department at Shreveport for Standard Oil Co. of Louisiana. Two years before being named research director for Interstate he served as general superintendent of the firm.

**J. Harold Bell,** 48, and **Edwin Crews Bell,** 46, Houston brothers, were killed in an automobile accident near Houston January 6. J. Harold Bell was president of the Bell Transportation Co., oil-field equipment contract firm.

**S. S. Stinson,** 64, chief scout for Humble Oil & Refining Co.'s West Texas division, died January 9 in Brownsfield, Tex. He was slated for retirement on the date of his death.

**Ralph D. Stauffer,** 61, oil producer and drilling contractor of Tulsa, died in Colorado Springs, Colo., January 8.

**A. C. Neely,** 53, Tulsa, clerk for Stanolind Pipe Line Co., died January 9.

**Julian Q. Myers,** retired district geologist at San Antonio for Shell Oil Co., died January 5. He was chief geologist for Sinclair Oil & Gas Co. in Tulsa from 1919 until 1926.

**Joel Clinton Ott,** 47, superintendent for Humble Oil & Refining Co. at Beaumont, Tex., died January 2.

**R. L. Agee,** 57, district manager of A-1 Bit & Tool Co., Corpus Christi, died January 5.

**S. H. Aiken,** director of purchases for the Star Drilling Machine Co., Akron, Ohio, died December 26.

**Richard James Chandler,** with Gulf Oil Corp. at Fairbanks, Tex., was killed in an automobile accident January 2.

**E. W. Moutray,** 74, vice president of the firm of Moutray-Moore Drilling Co., died in Abilene, Tex., January 1.

**R. L. Chapman,** 51, Port Acqers, Tex., employe of Gulf Refining Co.'s refinery for 27 years, died in Beaumont December 27.

**John L. Betts,** 60, industrial relations executive of General Petroleum Corp., Los Angeles, died January 2.

**Rual Bower Swiger,** 51, for 27 years active in Southwest Texas oil development, died in San Antonio January 5.

# Processing Plan Followed in Sohio's Program

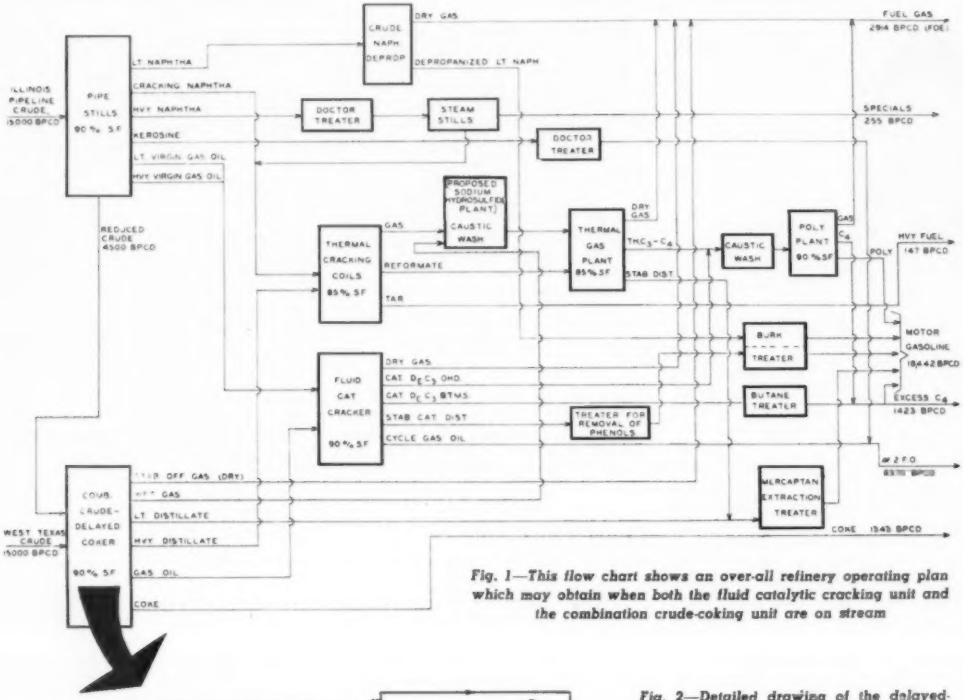



*Fig. 1—This flow chart shows an over-all refinery operating plan which may obtain when both the fluid catalytic cracking unit and the combination crude-coking unit are on stream*

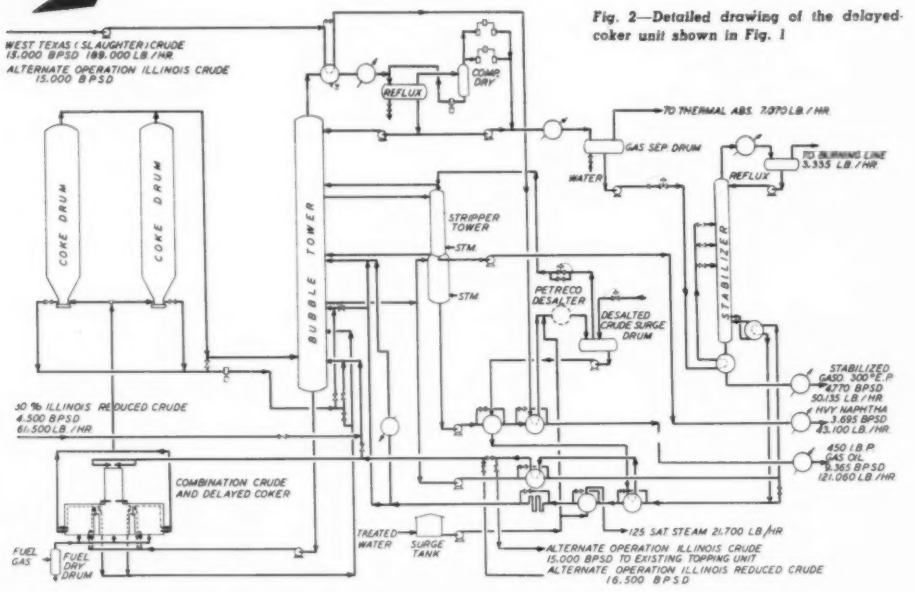



*Fig. 2—Detailed drawing of the delayed-coker unit shown in Fig. 1*

## *Flexibility, Efficiency Feature*

# SOHIO'S MODERNIZED LIMA REFINERY

**by George Weber**
**Refining Editor**

WITH a capital expenditure of $30,000,000, Standard Oil Co. (Ohio) is converting the Lima, Ohio, refinery to one of the most flexible and modern in the industry. Completion of the major construction program sometime next year will result in: (1) expansion of crude capacity to 35 000 bbl. daily; (2) extensive broadening of product range to include petroleum coke and lubricating oils, and (3) substantial increase in both yield and quality of gasoline and other distillate products at the expense of lower-valued residual fuels.

It is of interest to note that this modern refinery is located on the site of one of the first "major" plants to be built outside the Pennsylvania region. In 1886, 1 year following discovery of Lima field, Solar Refining Co. (Standard) erected the first stills to process the sour local crude. Next year, operations will again include sulfur crudes, originating over 1,600 pipe-line miles away in West Texas.

The new work at Lima comprises three major projects: a fluid catalytic cracking plant, a combination crude-coking unit, and a solvent lube-oil plant. The 16,000-bbl. per day cat cracker is now in operation. The combination crude-distillation and delayed-coking unit, capable of charging 19,500 bbl. daily, will be placed on stream in February. The lubricating-oil plant, incorporating vacuum distillation, propane deasphalting, furfural refining, M.E.K. dewaxing, and clay contacting, will be completed in mid-1950. This entirely new plant will have a productive capacity for 76,000 gal. of lubricating oils daily.

### Distillate Yields Increased

The degree to which catalytic cracking and crude coking will alter refinery operations is illustrated by Table 1 which compares an average of former refinery yields with anticipated operation on completion of the above two projects. A net increase of roughly 50 per cent in crude charged will result in an increase of 143 per cent in high-octane-gasoline production. Adoption of delayed coking will allow reduction of heavy-fuel-oil yield from 23.6 to 1.1 per cent of crude charged. This will be accomplished with a 15 per cent increase in unmarketed end products (catalytic coke, gas, and loss).

In recent years, the refinery has been operated almost exclusively on Illinois crudes. Continuing Illinois crude runs will be augmented next year by another 15,000 bbl. per day, probably Slaughter crude. This West Texas charging stock will be delivered to Lima in the new Mid-Valley Pipe Line, jointly owned by Standard of Ohio and Sun Oil Co.

### Refinery Operations

The new crude coker and cat cracker when operated in conjunction with existing units in the Lima refinery will provide sufficient flexibility to adjust to any foreseeable future market demand balance. An example of one anticipated flow scheme which conforms generally to yields in Table 1, is illustrated in Fig. 1.

This over-all refinery scheme, which does not include future lube-oil operations, shows one of a variety of balanced fuel-production schedules possible when West Texas crude becomes available. Illinois crude will be fractionated in conventional atmospheric pipe stills, into seven straight-run streams including the 30 per cent reduced crude bottoms. Light naphtha is depropanized and treated for blending to motor fuels. An intermediate naphtha cut is thermally reformed. Fractions of the heavy naphtha stream are further separated for straightrun special naphtha products, the remainder comprising additional reformer charge. Kerosine is doctor treated for sale or is caustic washed and blended directly to No. 2 furnace oil. Light and heavy virgin gas-oil cuts make up part of the fluid catalytic cracking feed stock.

### Crude-Coker Operation

An interesting adaptation of combined crude distillation and delayed coking is employed in the Lima crude coker. It mixes straightrun fractions from whole Slaughter crude, with topped Illinois crude and cracked fractions from both crudes. Since the virgin naphthas and kerosines from sour Slaughter crude are not marketable as such, their mixing with cracked cuts from the decoking operation is economically permissible for making up catalytic and reformer feed stocks.

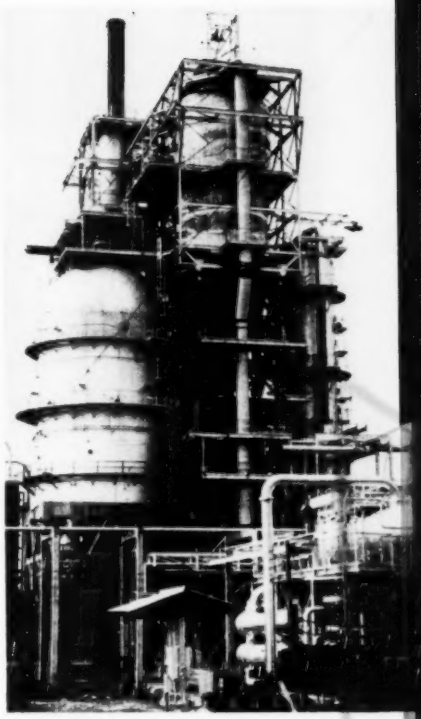


*Fig. 3—This view of the 16,000-bbl. fluid catalytic cracking unit shows the regenerator, left; the reactor vessel, upper right; and the main fractionator, right. Although various features of design were incorporated to reduce its height, the 196-ft. unit is the tallest industrial structure in Ohio*

The crude coker employs a combination furnace, two conventional coking drums and one common fractionating column in which all streams mingle. The three-bay, floor-fired furnace is equipped with burners which fire both gas and oil. It comprises one convection circuit and six radiant circuits. Total heat release for this furnace is rated at 114,000,000 B.t.u. per hour.

During normal operation in conformance with the over-all refinery flow-scheme shown in Fig. 1, the crude coker will be employed as shown in the flow diagram, Fig. 2. West Texas crude, preheated to 500° F. by waste heat from main fractionator streams, is desalted, and charged to the convection section and the dual crude radiant circuits of the furnace, thence to the main fractionator. Illinois 30 per cent reduced crude from outside atmospheric stills moves directly to the main fractionator.

Mixed residual products withdrawn

from the bottom of the fractionator are heated in the four decoker radiant circuits of the combination furnace and charged to the onstream coke drum. Cracked vapors withdrawn overhead comprise the third charge stream to the common fractionating column of the unit.

Continuous cycling of fractionator bottoms to the coking unit results in a net crude-coker production of three atmospheric distillate streams, comprising cracked and virgin stocks. The fractionator overhead is partially condensed by crude preheat and after wet-gas separation, is stabilized to yield dry gas for the refinery burning line, and a 300° F. e.p. gasoline termed light distillate. Two side streams comprise a heavy naphtha termed heavy distillate and a 450° F.-i.b.p. gas oil. Net input and production of the crude coker is outlined in Table 2.

### Crude Coker Features

The crude coker was designed and constructed by M. W. Kellogg Co. The two coke drums, measuring 17½ ft. in diameter and 70 ft. in height, hold 400 tons of coke each. They will be operated at either 20 or 40 psi. depending on desired recycle rate and content of volatile combustion matter in the coke product. A novel feature designed by Sohio engineers is a blowdown system which will recover wax tailings during the steaming of the coke drums.

The two coke drums are surmounted by full-length drill-stem structures. Conventional Worthington hydraulic coke-cutting equipment is employed, with a Dorr-Thickener mechanism for recovery of coke fines. A small single-drum car puller will spot empty railroad cars under the drums, and loaded cars will be removed from the unit area by a large two-drum car puller.

Paving beneath the drums is designed to provide for future installation of grating so that large trucks and truck trailers may be used for removing coke to storage. Both drums are served by a special Kellogg-designed movable platform for removing bottom heads. This platform incorporates a hydraulic support for the unbolted bottom head, and a circular rack supporting the pneumatic unheading tool.

Special provisions have been made for expeditious handling of equipment during metal inspections and turnarounds. A Gantry crane will handle all heat-exchanger bundles at grade. Trolley beams are installed in pump and compressor rooms and over all above-grade exchangers. An elevator extends to the top of the coke drums.

In the distillation section of the unit, steam strippers are installed to strip heavy naphtha and gas-oil products. Full advantage is taken of heat in withdrawal streams from the main tower. In addition to the crude preheat obtained from fractionator products, the unit incorporates a gas-oil pumparound system. About 40,000 bbl. per stream day is withdrawn to preheat crude charge, reboil the stabilizer, and generate 21,000 lb. of steam per hour, before return to the tower.

Vapors from the partially condensed main fractionator overhead stream are compressed to 150 psig. in two 400-hp. units, then recombined with the liquid condensate. After further cooling, the mixed stream passes to the gas-separation drum. Wet gas passes out of the unit to a thermal absorber, and the resulting liquid is fed to a 24-plate, 345-psig. stabilizer.

Sufficient alloy protection is incorporated in unit equipment for handling high-sulfur crudes. For operating temperatures above 600° F., 7 per cent chrome, 1 per cent molybdenum furnace tubes and 9 per cent chrome furnace header boxes are installed. All piping operating above 550° F. is of 4-6 per cent chrome moly. The lower portion of the main-tower reflux drum is lined with monel and the reflux drum water drawoff pot and connected piping is solid monel. The lower section of the main fractionator tower operating above 525° F. is lined with 5/64-in.-thick, 11-13 per cent chrome. Coke drums are lined with 5/64 in. of 11-13 per cent chrome material. All hot service pumps are fabricated of suitable alloys and a corrosion allowance of ⅜ in. is made for all carbon-steel vessels.

### Fluid Cat Cracker

The new 16,000-bbl. per day fluid catalytic cracking unit will charge straightrun gas oils from atmospheric crude stills plus about 9,365 bbl. per stream day of mixed virgin and cracked, 450° F.-i.b.p. gas oil from the crude-coker unit. This heat balance unit is designed to use microsphere catalyst. An average reactor temperature of 900° F. will be maintained for conversion to 65.8 per cent based on 430° F.-e.p. high-quality gasoline. Catalyst-oil ratios of 11.1 on total feed and 14.6 on fresh feed will obtain. At operating rates anticipated, weight hourly space velocities on total feed and fresh feed will be 1.32 and 1.00 respectively. Under normal operations the cat cracker and light-ends recovery unit will show yields as follows:

| | |
|---|---|
| Gasoline, vol. per cent | 47.5 |
| Gas oils, vol. per cent | 34.2 |
| Butane, vol. per cent | 13.9 |
| Gas, C and lighter, wt. per cent | 7.7 |
| Coke, wt. per cent | 7.4 |

Process design for the unit is by Universal Oil Products Co. and mechanical design and construction was handled by Arthur G. McKee Co. It is of interest to note that due to close cooperation among owners, designer, contractor, and labor, this unit was completed materially ahead of the originally estimated date.

The reactor is a swedged vessel with inside diameters of 26 and 23½ ft. for the top and bottom sections respectively. Its total straight height is

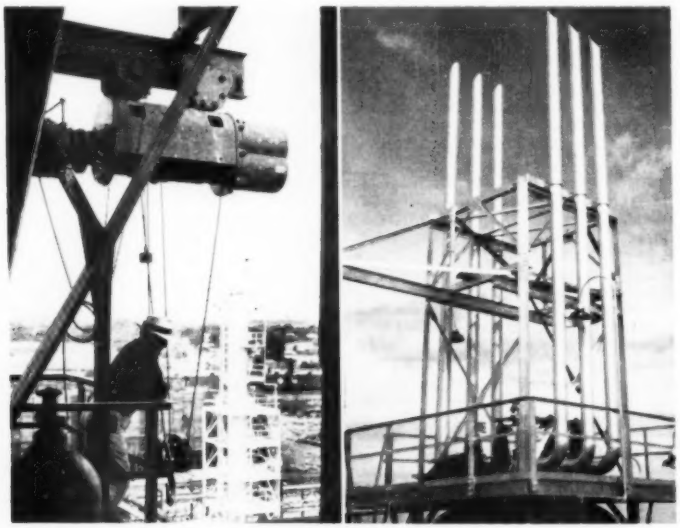


*Fig. 4—(Left) Electric hoists operating on permanent trolley beams are spotted throughout the cat cracker structure for efficient handling of heavy equipment pieces. Most beam systems, such as this one, overhang the adjoining roadway for direct removal of equipment to trucks or trailers at ground level. Fig. 5—(Right) These safety valves atop the reactor vessel are also served by a trolley beam from which heavy equipment may be lowered by intermediate stages, to ground level*

43 ft. and its incorporates five single-stage cyclones for separation of catalyst from cracked petroleum vapors. The reactor is installed at a higher elevation than the regenerator and spent catalyst moves directly to the regenerator by gravity. This design allows a regenerator pressure of 17.5 psig. while reactor pressure is maintained at 9.0 psig. The higher regenerator pressure allows faster coke-burnoff rate, in turn permitting a smaller vessel, lower catalyst inventory and a lower catalyst makeup rate for the given cracking unit capacity.

The regenerator measures 34 ft. inside diameter of the lining and 44 ft. in straight height. It employs a total of 12 cyclone separators operating in two stages. The flue-gas line, looped to reduce unit structure height, includes a release valve, expansion chamber and muffler.

The catalyst stripper, measuring 10 ft. by 31 ft. 7 in. is incorporated within the bottom section of the reactor to decrease height of the unit structure. Spent catalyst flows to the stripper under a slight pressure differential, through 30 flapper doors set at three separate elevations, and through 12 vertical slots located near the stripper top. Thus the catalyst level in the reactor may be adjusted for a wide range of desired space velocities.

Main fractionator overhead products pass to a demethanizing stripper via compressor for separation of all methane and most of the ethane and H.S. This prior rejection of light gas permits a lower stabilizer pressure. In the stabilizer, demethanized stripper bottoms are split into a bottom fraction of stabilized cracked gasoline and an overhead of butanes and lighter which pass to the depropanizer. The propane overhead from the depropanizer moves to a caustic wash unit and to the expanded refinery polymerization unit. Butane bottoms from the depropanizer tower are treated before blending for motor fuel or movement to butane storage.

The main fractionator is designed for withdrawal of one side stream of light gas-oil product which is stripped and moved to storage as a finished furnace oil. Unstripped light gas oil preheats the fresh cat feed stock and is also used, after cooling, as lean oil in the absorber. Heavy gas oil, including all remaining fractions charged to the main fractionator, is withdrawn as tower bottoms and recycled to the reactor with fresh feed.

While designed for 60 per cent propane recovery, initial operation shows that 90 per cent recovery is being attained due to the use of well water on the lean-oil coolers and the low hydrogen content of absorber off gas. The depropanizer has been instrumented to allow a full range of operation from total liquid overhead to total gas. Gas compressors in the

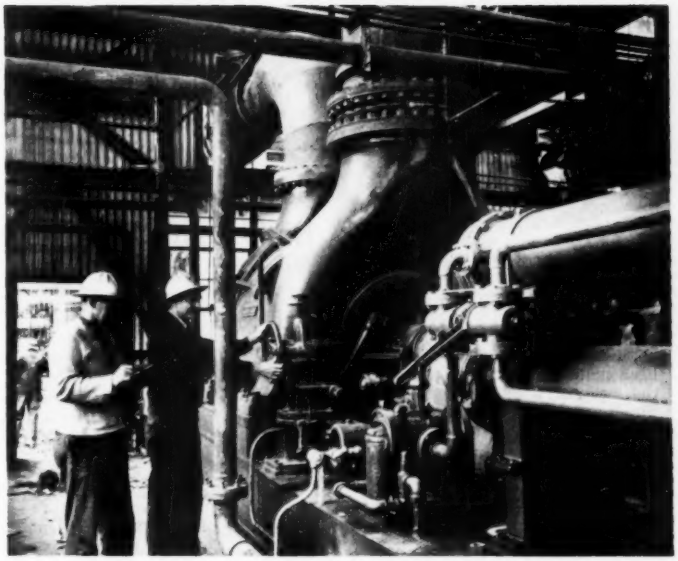


*Fig. 6—This interior shot in the blower building shows one of the two air blowers, each of which is driven by a 3,000-hp. electric motor and delivers 23,000 cu. ft. per minute of air to the regenerator*

unit, which normally are fueled by poly-plant tail gas, may be automatically fed makeup fuel from the depropanizer overhead receiver when pressure in the fuel-gas mixing drum drops below a prescribed limit. Provisions are made in the cat cracker for possible future addition of a furnace, slurry settler, waste-heat boiler, electric precipitators, and catalyst coolers.

Like the crude coker, the fluid cat unit is laid out to allow maximum accessibility and efficiency of maintenance. Both new units incorporate many sound suggestions from members of the refinery's mechanical and process departments who will be responsible for operation and maintenance.

In plot plan, the cat cracker occupies a rectangular battery area extending in a general north-south direction. It is served by five parallel, paved, 24-ft. north-south roadways,

*(Continued on page 77)*

**TABLE 1—OPERATION OF SOHIO'S LIMA REFINERY BEFORE AND AFTER CAT CRACKER AND CRUDE COKER INSTALLATION**

| | Before | | After | |
|---|---|---|---|---|
| | B.P.C.D. | Vol. % | B.P.C.D. | Vol. % |
| Crude | 18,200 | 100.0 | 27,000 | 100.0 |
| Excess B-B | 0 | 0.0 | 800 | 3.3 |
| Naphtha specials | 300 | 1.6 | 0 | 0.0 |
| Gasoline | 7,200 | 39.6 | 17,500 | 64.8 |
| Kerosine | 900 | 4.9 | 1,190 | 4.4 |
| No. 2 fuel oil and diesel | 3,500 | 19.2 | 4,380 | 16.3 |
| Tractor fuel* | 100 | 0.6 | 100 | 0.4 |
| 4A fuel | 700 | 3.8 | 0 | 0.0 |
| Heavy fuel | 4,300 | 23.6 | 300 | 1.1 |
| Coke (10 lb. per gal.) | 300 | 1.6 | 1,320 | 4.9 |
| Cat. coke (10 lb. per gal.) | | | 720 | 2.7 |
| Gas and loss | 1,300 | 7.1 | 2,140 | 7.9 |
| Total | 18,600 | 102.0 | 28,530 | 105.8 |

*One-half kerosine plus one-half naphtha.

**TABLE 2—NET INPUT AND PRODUCTION OF THE CRUDE-COKER UNIT**

| Input: | | | | B.P.S.D. |
|---|---|---|---|---|
| Slaughter, West Texas, crude | | | | 15,000 |
| 30 per cent reduced Illinois crude | | | | 4,500 |
| **Production:** | **Lb. per hr.** | **B.P.S.D.** | **Wt. %** | **Vol. %** |
| Stab. off gas | 3,335 | | 1.3 | |
| Wet gas to abs. | 7,070 | | 2.8 | |
| Stab. gaso., 300 e.p. | 56,135 | 4,770 | | 24.4 |
| Heavy naphtha, (290° -475° F.) | 43,100 | 3,695 | | 19.0 |
| Gas oil | 121,000 | 9,365 | | 48.0 |
| Coke | 25,800 | | 10.3 | |

SHELL'S

# MARINE RIG NO. 10

## . . . A new approach to the reduction of high costs of offshore drilling—

**by Leigh S. McCaslin, Jr.**
District Editor

SHELL OIL CO.'S marine rig No. 10 —a new approach for reducing the extremely high costs of offshore drilling—is now drilling its "shakedown" well in Block 69 field off the Louisiana coast.

Complete equipment, derrick and all, for drilling a 15,000-ft. well has been mounted on a converted LST—the wartime workhorse of the Navy. The rig is designed for what Shell calls "semioffshore" work. Its normal operating range is in water from 7½ to 16 ft. deep. By dredging, of course, the unit could operate in shallower water. Movement of the LST is accomplished by towing the craft from one location to the next.

LST's have seen considerable use in drilling in Gulf of Mexico waters. However, the procedure has been to anchor them next to a stationary platform upon which the derrick and draw works are mounted. Hence, the LST serves as a tender with mud, drill pipe, and auxiliary equipment aboard, plus living quarters for the men working on the well. With its marine rig No. 10, Shell has eliminated the necessity for a stationary platform and provided a completely mobile unit.

First well for the new rig will be on State Lease 988, Main Pass area, Block 69 field, and is projected to 8,500 ft. The location is in 9½ ft. of water. Shell has already brought in two producers in Block 69 field and The California Co. is credited with four oilers. Shell has laid a 13,500-ft. long, 4-in. marine pipe line to handle its production. The line has its shore terminus at North Pass.

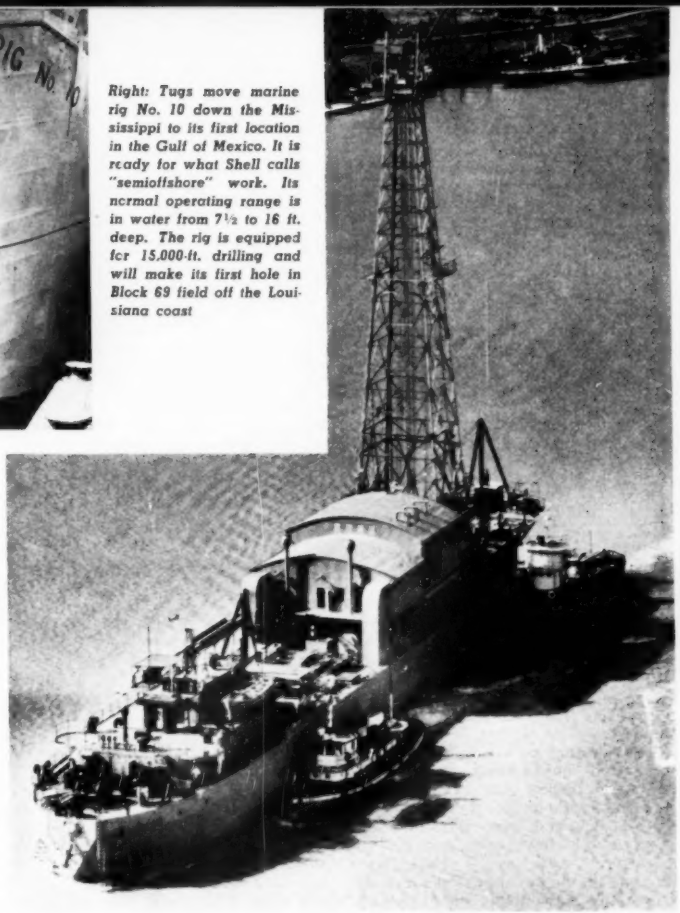
Marine rig No. 10 is well suited to Shell's Louisiana offshore operations for several reasons. In the first place, the company has a very considerable amount of acreage under lease. Hence, it was necessary to devise an economical method of testing the many prospects in this large area. It would be extremely expensive to build stationary platforms for the many wells which will probably be necessary. Secondly, the major portion of the offshore acreage which Shell has leased is in 15 ft. of water or less. Hence, rig 10 is suited for drilling in just about any location that might be chosen.

Gibbs & Cox, Inc., naval architects of New York City, prepared the conversion plans for Shell's new rig. Actual conversion was carried out in the yards of Avondale Marine Ways, Inc., Avondale, La. Selection

*Left: This aft view was taken while the drilling equipment was being installed. Auxiliary pipe racks can be seen in the foreground. On the stern is the winch system which helps anchor the LST during actual drilling operations*

*Derrick and drilling equipment were installed on Shell's new marine rig No. 10 while it was tied up to a New Orleans dock. Conversion work on the LST had been previously carried out in the yards of Avondale Marine Ways, Inc., at Avondale, a few miles up the Mississippi River*

*Right: Tugs move marine rig No. 10 down the Mississippi to its first location in the Gulf of Mexico. It is ready for what Shell calls "semioffshore" work. Its normal operating range is in water from 7½ to 16 ft. deep. The rig is equipped for 15,000-ft. drilling and will make its first hole in Block 69 field off the Louisiana coast*



*An 8 by 69-ft. drilling slot was cut in the bow of the LST to allow the barge to be backed off the christmas tree after a well is completed. A specially built pontoon, partially submerged, can be seen in the slot. This 7½ by 54-ft. pontoon serves as a guide to the LST as it is pulled onto location. It is also designed to replace the bottom bearing surface which was lost when the slot was cut. There is a flange around the bottom edge of the pontoon upon which the LST settles when sunk*

and installation of the drilling equipment were handled by Shell's drilling and mechanical-engineering sections. The men supervising these sections are Paul L. Guarin, regional chief mechanical engineer, from the Houston office, and R. N. Myers, area drilling superintendent, and W. E. Harpst, area chief mechanical engineer, both from the New Orleans office of the company. Supervision of work at the job site was by M. L. Clayton and R. G. Mallander of the drilling and mechanical sections.

Over-all supervision of the activities of rig 10 is the responsibility of E. Dykstra, Shell's New Orleans area manager. Area production manager is E. N. Van Duzee. Tool pushers on the new rig are Paul Lewis and J. H. Cranfill.

In the conversion work, the bow doors were removed from the 328-ft. LST and an 8 by 69-ft. slot cut out in the bow of the craft. This drilling slot is similar to that on a conventional slotted-type swamp barge. However, the positioning procedure in preparing for drilling a well is different.

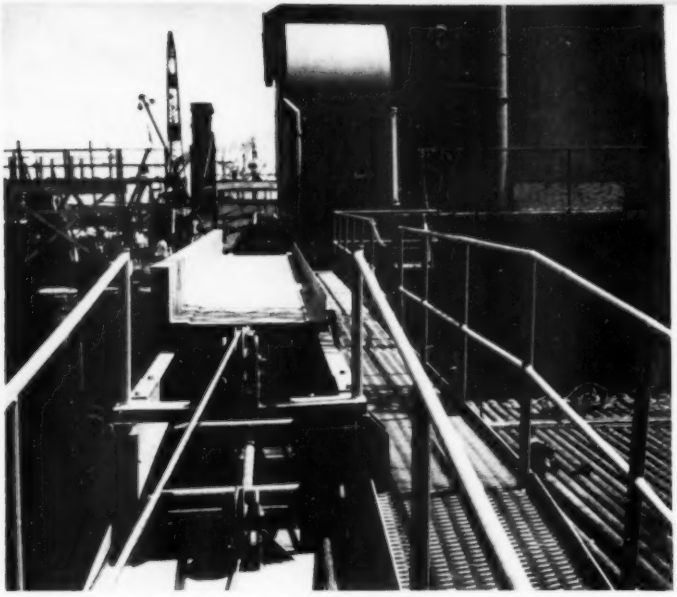
First step is to drive a string of surface casing at the well site. Next, a specially built pontoon is sunk at the location and secured by driving piling through it. This 7½ by 54-ft. pontoon fits into the slot of the LST and thus serves as a guide to the LST as it is pulled onto location. A system of winches anchored to piling serves to pull the LST on location after it has been towed to the general area by tugs. These same winches help keep the craft in position during drilling operations.

Three war-surplus 204-ft. LSM's will be sunk on the seaward side of marine rig 10 to act as breakwaters. This procedure has been followed by Shell in the drilling of previous wells in Main Pass field. However only two LSM's have been used heretofore. After a well has been drilled, the LSM's can be refloated and moved to the next location. With the protection afforded by the LSM's, it is expected that the rigs can remain on location at all times except during hurricanes. In this event, it will be pulled off the well and towed to a sheltered area.

Biggest design problem confronting the engineers was the problem of stability during drilling. In the first place, Shell purchased an LST of a class which has a flat bottom over most of the length. Hence, it is ideally suited for use as a submersible drilling barge. The special pontoon, which was mentioned earlier, in addition to being a guide for positioning the LST, fits into the stability picture. It is designed to replace the bottom bearing surface which was lost when a slot was cut into the LST. There is a flange around the bottom edge of the pontoon and when the LST is sunk it settles on top of this flange. Hence, the pontoon is helping to support the weight of the LST. This support is particularly important in the bow as there is a lot of weight—drill pipe, derrick, crane, electrical-logging unit, etc.—concentrated in this part of the craft.

The bearing pressure of the LST on the gulf bottom is highly important. It is possible to vary this pressure from 0 to 800 lb. per square foot by means of the ballast tanks. There are 32 of these tanks with a total capacity of 23,039 bbl. or 3,697 tons of salt water. A rather involved flooding plan has been worked out by Shell engineers to control the bearing pressure, and also the trim of the vessel during sinking. Detailed flooding procedures for two loading conditions have been worked out. One is for an initial draft of 5 ft. 6 in. to 8 ft. and the other is for an initial draft of 8 to 10 ft. One of these draft conditions assumes a full or almost full load of pipe, mud, fuel, etc., while the other assumes a lightly loaded condition.

The diesel oil, process fresh water, potable fresh water, reserve mud, and slush-pit storage tanks all have a very important bearing on the stability question. When full, the diesel-oil tanks will hold 260 tons, the process water 292 tons, and the fresh



*This cable-operated pipe dolly brings pipe from storage at the aft end to the active pipe racks near the drilling floor at the bow. A crane is used to load and unload the dolly*

water 82 tons. In addition, the reserve pits will hold 1,896 bbl. and the slush pits 753 bbl. Assuming 11-lb. mud, the total weight of a full load of mud would be 612 tons.

Several precautions have been taken to insure that a close check can be kept on the stability of the vessel. List and trim indicators that read to 0.1° have been installed. In addition, strain gages have been placed on the turnbuckles which tie down the blowout-preventer hookup. Since the blowout-preventer hookup is much higher above the surface casing than is the case on a dry-land well, these strain gages are extremely important. The bottom of the hookup will be approximately 25 ft. above the ocean floor in a normal operation. Hence, a slight list of the LST could conceivably cause a leak at some connection or even break the casing. This obviously would be a very dangerous situation, particularly since the rig will be drilling in inaccessible offshore locations.

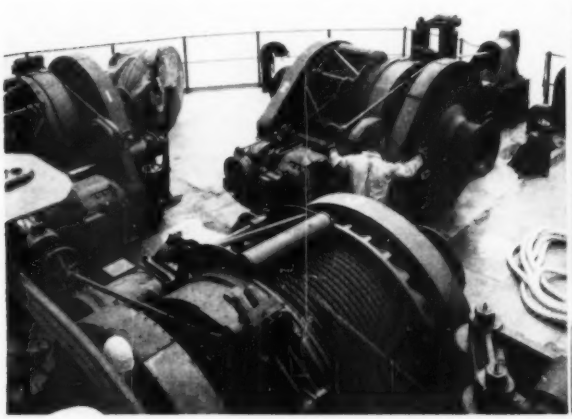
An unusual feature of marine rig 10 is the movable pipe ramp for handling casing and drill pipe from the rack. This ramp can be raised and lowered to the most desirable level for pulling pipe off the rack. It is expected to be particularly helpful in running casing in the hole. The ramp is raised and lowered by an electric-motor-driven worm-gear arrangement. It is controlled by a man below the ramp who raises it to the desired point with the motor and then uses steel pins to hold it in place.

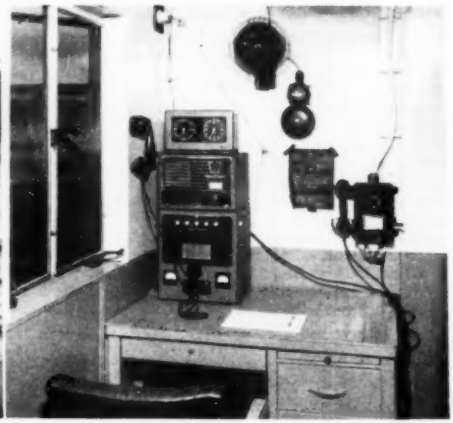
Another feature is the pipe dolly which brings pipe from storage at the aft end of the LST to the pipe racks near the drilling floor. This dolly is pulled by a cable and electric winch. To handle sacked mud materials, Shell engineers designed a vertical conveyor to raise the sacks from the dry-mud storage rooms in the wing walls of the LST up to the mud-mixing rooms that are located directly above the pits.

Major items of equipment aboard marine rig 10 are as follows:

- 140 by 30-ft. Lee C. Moore derrick.
- National 125 draw works.
- Three Superior PTD8 diesel engines.
- Emsco type M-50 crown block.
- Emsco type M-50 traveling block.
- Deckard adjustable monkey board.
- Dynamatic model 6032 brake.
- Varco type 4 KRS kelly drive bushing.
- Foster breakout cathead.
- Foster spinning cathead.
- Omsco kelly cock.
- Three Mixco propeller-type mud agitators.
- Three Ross 1008 heat exchangers.
- Two 16-in. o.d. Byron Jackson casing elevators.
- Five-inch o.d. Byron Jackson drill-pipe elevators.
- Buda PCD-1679 six-cylinder diesel engine.
- Byron Jackson power slips.
- Byron Jackson 4300 rotary hook.
- Four-inch by 55-ft. Chiksan rotary drilling hose.
- Pit-O-Graf.
- Martin-Decker type D weight indicator.
- Five and one-quarter-inch Baash-Ross kelly.
- Hydril type GK preventer.
- Two QRC 12-in. 6,000-lb.-test blowout preventers.
- Two 3-in. Gardner-Denver centrifugal pumps.
- National C-150 mud pump.
- Two Ideal type C-350 slush pumps.
- Ideal type SHS 20½-in. rotary.
- Two Baash-Ross type "DU" rotary slips.
- Gray type B-44 rotary swivel.
- Fisher marine radio telephone transmitter.
- Spang 5-in. o.d. internal-upset drill pipe.

*Left: In positioning the barge at the drilling location, these cables are anchored to piling and the winches pull the LST onto location. These same winches help keep the craft in position during drilling operations. Right: Contact with shore headquarters is maintained with a marine radio-telephone. Storm warnings and other emergency messages can thus be delivered quickly. The telephone on the right is part of the ship's intercommunication system*





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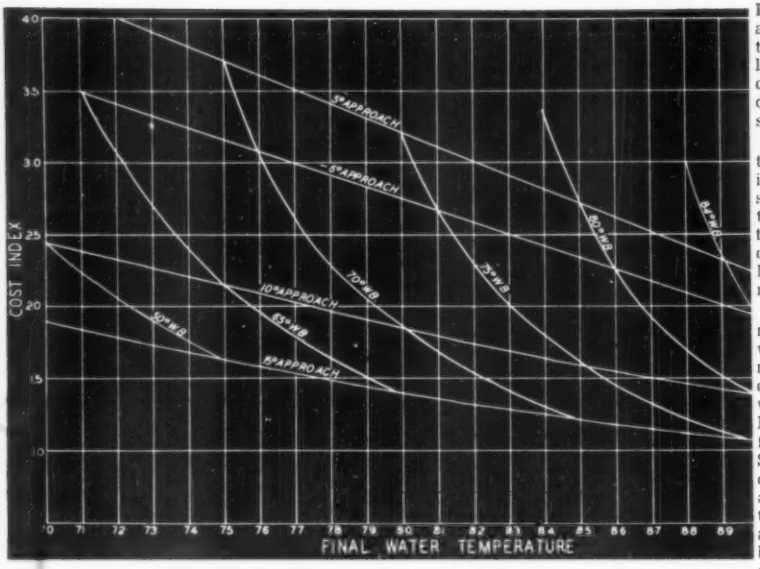


*Comparative cost of cooling towers for varying conditions of wet bulb, approach to wet bulb, and final water temperature. (Based on 20° F. cooling range)*

## Selection, Operation, and Maintenance of

# Water-Cooling Towers

**by Neal B. Laubach***

**Size and cost of this item vary widely. This article presents suggestions and a chart to aid in making proper selection**

THE selection of cooling-tower size or type depends upon the specific nature of the heat-disposal problem. For example, in the power industry, the steam-electric station requires cooling water for the single service of steam condensing, while in the process industries the problem becomes more complex due to the variety of services and different temperature levels encountered.

Heat removal at the higher-temperature levels may be handled economically in air-cooled heat exchangers. Such services include operations at temperatures above 160° F. Heat-removal duty generally under 120° F. can be handled at lower cost by the use of a cooling tower and circulating-water system. The intermediate zone services between 120° and 160° F. can be cooled either with air-cooled units or cooling-tower water, depending upon cost and availability of water. If the water is plentiful and of good quality these services will be handled more economically with the water-cooling tower. If, however, the water is extremely scarce, or of poor quality requiring costly treatment, these services should be handled with direct air cooling. There will of course be border-line situations which are not subject to such generalization and will require individual analysis.

*Manager, cooling tower division, Hudson Engineering Corp. Portion of paper given at regional meeting, N.G.A.A., Amarillo. Related material (N.G.A.A.) by the author on this subject appeared in The Oil and Gas Journal, issue of October 27, 1949, pp. 73-77.

### 20° Range Average

Water above 120° F. usually deposits scale and this frequently limits the maximum temperature. Atmospheric-type coolers customarily operate with a 15° F. water-temperature rise, while shell-and-tube coolers operate between a range of 15° and 30° F. rise. A range of 20° F. is about average for most processing installations. Very few cooling-tower installations have a cooling range in excess of 30° F. although they can be designed for any cooling range desired.

In general the most economical system is one with the maximum cooling range. This is easily understood, since a long range reduces the quantity of water circulated. Cooling-tower performance, expressed in terms of heat removed per unit of size, is likewise greater with a long cooling range.

A very careful analysis should be made before setting the minimum water temperature. The Weather Bureau records in the locality should be consulted for wet-bulb temperatures, wind directions, and wind velocity. Dry-bulb temperatures have little effect on cooling-tower performance. Summertime conditions are the most critical for cooling-tower performance, therefore it is recommended that the design wet bulb be taken as the average of the highest wet bulb each day for the most severe summer month. The high reading should be for at least 1 hour duration. Occasional high values of short duration should not be considered.

### Wide Cost-Size Range

Cooling-tower size and cost can vary over a wide range, depending upon the final or cold-water temperature, the atmospheric wet bulb, and their relation to each other. The importance of this relation is illustrated by the accompanying chart. Curved lines designating wet bulb temperatures have been plotted against final cooling-tower water temperature and cost index. Lines have been drawn through points of 5°, 6°, 10°, and 15° approach. The cost index is based on comparative dollar cost of cooling towers of similar design with constant water circulated and constant 20° cooling range.

**Example.**—Cost index for 80° final water and 70° wet bulb equals 1.8. For the same conditions except 78° final water, cost index equals 2.26. Therefore, 78° final water will cost 2.26/1.8 or 125 per cent of the cost of 80° water.

The chart can also serve as a guide to performance at wet-bulb conditions other than design.

**Example.**—A cooling tower selected for 80° final water and 70° wet bulb and cost index of 1.8, by following this horizontal line at 1.8 to the intersection of the 75° F. wet-bulb line, it will be observed that a final water temperature of 83.5° F. is obtained.

By balancing the cost of water temperature against the cost of other equipment and product yield, it will be possible to set the most economical water conditions.

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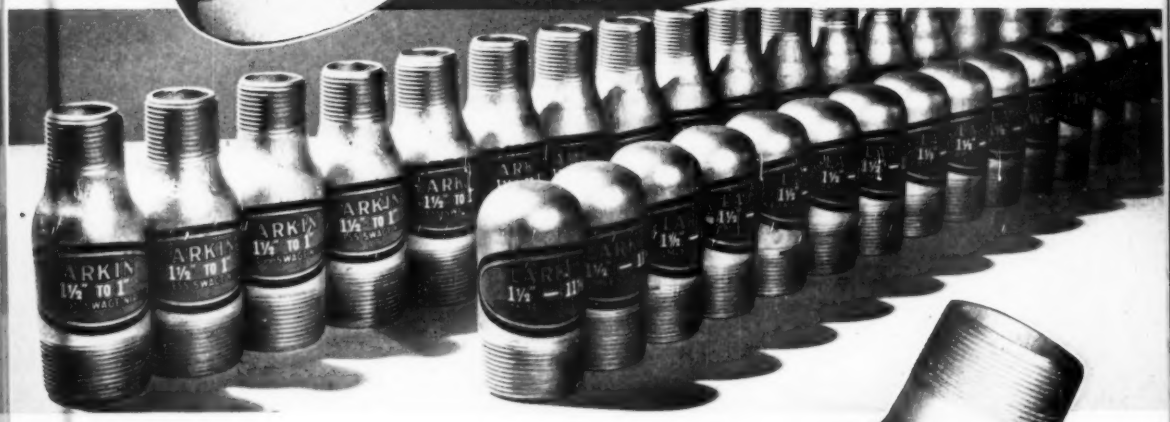

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# Automatic COMPRESSOR STATIONS

by T. S. Bacon*

THE best reason for designing a compressor station to operate automatically is saving in operation costs. Minimum costs of maintaining operating personnel at a compressor station on a 24-hour basis is in the order of $12,000 per year at present rates for such labor. It is obviously impossible to save all of this personnel expense by application of automatic controls to present-day equipment, as some maintenance work necessarily must be done during the life of the station. Therefore, this figure represents the maximum payroll saving that might conceivably be effected through automatic operation. On this basis, assuming a station designed to pump a million cubic feet per day, or 365 million cubic feet per year, the cost of labor for full-time attendance on a nonautomatic station would be just over 3 cents per thousand cubic feet of gas compressed. So it is apparent that the cost of labor can be an extremely important item in the over-all cost of gas compression, particularly in the smaller stations.

There are advantages obtained from automatic control other than the saving of payroll expense. These advantages arise from the close approach to ideal conditions which result from the application of proper controls to a well-designed plant. Specifically, cooling-water temperatures and crank-case oil temperatures are held more closely to the optimum temperatures in automatic plants than in manually operated plants not equipped with automatic devices to accomplish these specific purposes. In addition, automatic controls can be selected to make the compressor unit follow load fluctuations almost instantaneously and much more efficiently than is normally accomplished where manual readjustment is required. The trend during recent years has been toward the use of more automatic controls in all compressor stations, whether operated with an attendant continually on the job, or otherwise.

The principal disadvantages apparent in the operation of the automatic compressor stations are, first, the cost of equipping the stations with the necessary controls and limit switches, and, secondly, the increased downtime occasioned by the fact that operating personnel are not continually available to correct the condition that causes the station to go down immediately after that condition becomes evident. The cost of controls and limit switches is nominal, in general, and a minor percentage of the total plant investment. The increased downtime is, of course, largely determined by the time lag between failure of the station and arrival of the repair personnel at the station, and therefore is largely determined by local factors. Downtime can be reduced substantially by a carefully planned and scheduled procedure of maintenance.

### 97.3 Per Cent Operating Time

A report previously published† covering the first 2 years of operation of our automatic compressor station at Cayuga, Tex., indicated that it operated 97.3 per cent of total elapsed time during the second year. The records show a minimum operating time for any 1 year of 95.5 per cent and an average operating time during the 4 years of operation of 96.3 per cent. It seems reasonable to allow 0.5 per cent downtime for maintenance of any internal-combustion engine, so the maximum penalty paid for automatic operation in this instance is about 4 per cent of total downtime.

Cayuga station is more elaborate than our other automatic stations. It was designed along entirely conventional lines, and as it would have been designed had we planned on continuous attention. This station of conventional design was then supplied with automatic controls to vary the volume of gas compressed by the station in accordance with the volume of gas available from the field, and to compress this gas with maximum efficiency. This variation was taken care of automatically from zero throughput up to the full-load rating of the compressor. A rather complete set of limit switches was provided to cause the station to shut down in the event temperatures or pressures exceeded their designed limits, or in the event of pipe-line or pressure-equipment rupture or stoppage by hydrates.

Lone Star Gas Co.'s Groesbeck field compressor station was designed on a totally different theory. This unit consisted of a gas engine rated at 100 hp., at 1,000 r.p.m., driving a small two-cylinder, double-acting compressor through V-belts. The compressor had been retrieved from the junk pile, and it was hoped that the station would operate for 6 months, at the end of which time it was believed that it would be no longer required. The controls in this station were reduced to the absolute minimum and involved an overspeed trip on the engine and the usual engine safety controls to shut the engine down in the event of lubricating-oil failure, and in the event cooling-water temperatures became excessively high. The compressor was nonoverloading under any anticipated suction or discharge pressure condition and was, of course, less efficient than might be desirable under some operating conditions. However, the installation was made quickly, and at minimum expense, and performed very satisfactorily under the conditions pertaining to this location.

Less than a year ago, approximately 3,000 hp. was installed in unattended compressor stations in Shamrock field, Texas. The largest of these stations contains four units, each rated at 330 hp., and the smallest station contains a single unit only rated at 50 engine horsepower. These stations are made up of so-called skid-mounted units as supplied by several manufacturers, and all cooling is with radiators rather than by cooling towers.

The compressor units as supplied by the manufacturer are each individually equipped with the four essential controls; namely, an overspeed switch, a lubricating-oil pressure-failure switch, an excess cooling-water-temperature switch, and a discharge-pressure-relief valve. We have operated these units for about 10 months with success, using these controls only. However, we are adding a valve to control suction pressures

*Lone Star Gas Co., Dallas. Paper presented at regional meeting, N.G.A.A., Amarillo.

†See The Oil and Gas Journal, October 4, 1947, p. 58 et seq.

within limits to prevent overloading of the engines that remain running in any station that would otherwise occur in the event one unit in the station should fail. These stations take suction from several gas wells, and the suction pressure is dependent on the number of wells turned into the plant suction system, and on the plant throughput. Therefore, in the event one unit in the multiunit plant fails, the suction pressure will increase as the plant throughput is decreased. Increasing suction pressure tends to overload these units, and therefore, it is probable that the entire station will be stalled by overload in the event one unit in the station fails for any reason. The automatic suction pressure-control valve will prevent excessive increases in suction pressure in the event of failure of a single unit, and therefore will prevent overloading of the units that continue in operation.

### Automatic Speed Control

Automatic speed control is also being added to the larger units in Shamrock field. The total gas delivered from this field must be reduced occasionally to comply with the dispatcher's orders. When this reduction becomes necessary, it is possible to increase the field unit discharge pressures, and this increased discharge pressure will result in automatically resetting the governors on the units to reduce their rotative speed. Conversely, as the dispatcher's demand for gas from the field increases, the discharge pressures on the field stations will be decreased and the automatic governors will increase the rotative speed to the maximum permissible.

Based on the above experiences, it is an obvious conclusion that the design of any automatic compressor station, insofar as the type of mechanical equipment installed is concerned, and also insofar as the type of control equipment used is concerned, should be determined by the performance requirements pertaining to that particular station. The total number of automatic controls which could be used in an elaborate station is almost without limit, and the designing engineer is occasionally tempted to go further with the use of automatic controls than is economically desirable, particularly if he is intrigued by the operation of such equipment. For example, a spark-plug failure is one of the most frequent causes of internal-combustion-engine failure. It is practically possible to provide equipment in the automatic stations to detect incipient spark-plug failure, to shut down the engine when incipient spark-plug trouble becomes apparent, to change the offending spark plug, and to restart the engine and put it back on the line. The complexity and expense of such equipment makes its use entirely uneconomical under present-day conditions, even though it would be fascinating to watch the gadget work.

Careful records kept on our Cayuga compressor station indicate that spark-plug troubles particularly, and ignition troubles in general, can be kept well under control by periodic replacements. After determining the proper spark plug to use in the engine, the average life expectancy of the plug should be determined by observation in the field. After determining this average life expectancy, all plugs in the engine should be changed after they have operated for approximately 80 per cent of their average life expectancy. Our records on Cayuga show that all plugs are operated for 90 to 125 days and then replaced with new plugs. We have experienced only one engine shutdown due to plug failure during the 4-year period that we have followed this procedure.

In our opinion, it is desirable to examine thoroughly once every 12 months each compressor unit that operates continuously. This examination includes testing all bearings, determining condition of the cooling system with particular attention to evidences of scale and corrosion, and a thorough check of the power cylinders for carbon, port or valve condition, and cylinder and ring wear.

There has been some question regarding the use of pneumatic controls versus the use of electrical controls in automatic compressor stations. We have found that pneumatic equipment is reliable in operation and easily applied to the problems of primary control of pressures or throughputs. These problems involve gradual resetting of flow-control valves or of the engine-speed-regulating governor. Pneumatic controls can also be used for systems requiring snap-action operation, to open and close compressor-cylinder clearance pockets, or to lift compressor-cylinder suction valves, by incorporating snap-acting pneumatic pressure pilots in the control system.

### Electric Limit Switches

In a station supplied with electrical energy, the commercially available electric switches actuated by temperature, or by pressure, are less expensive than comparable pneumatic devices, particularly when explosionproof wiring can be avoided in the installation. Therefore, we have frequently used electric switches as limit switches to shut down the unit in the event temperature or pressure conditions exceed the desired range. The expense of explosionproof wiring has been avoided by limiting the current and voltage on the electrical system to values so low that no hazard can result from any conceivable accident to the electrical system.

When using low voltages and currents, the sparking intensity in the electrical system is reduced to a degree such that natural gas-air mixtures cannot be ignited, and therefore no explosion hazard results from the use of open wiring in such circuits. The electrical control system operates through a sensitive relay to cause actuation of station shutdown valves. In this regard, it would be helpful to the design engineer, in my opinion, if information on maximum currents and voltages that could be used safely under such conditions were available in the literature, or in the codes covering electrical installations.

A very necessary detail of design that must be kept constantly in mind by the engineer charged with the responsibility of designing automatic stations is that all controls must fail in the safe position. Specifically, fuel gas is supplied to the Cayuga engine under a pressure of approximately 30 psig. A normally closed solenoid valve is provided on the gas line entering the fuel surge drum on this engine, and a normally open solenoid valve is installed on the line draining this fuel surge drum to atmosphere. During normal operation, the valve in the fuel line is held open by the solenoid, and the drain valve is held closed by its solenoid. Therefore, in the event any of the electrical limit switches are actuated, current flow to the solenoid valves is interrupted and the station is shut down. Also, in the event of failure of electrical energy, which would render the electrical control system inactive, the station is also shut down so it "fails safe."

### Education of Workers

Another important consideration in the successful operation of automatic compressor stations is the education of the individual or group charged with operation of the station. There is a tendency for the operator who is experienced only in the operation of attended stations to be somewhat skeptical regarding the feasibility of operation of an unattended station. As his experience with the unattended station increases, he will, of course, feel differently. He will learn that intelligent analysis and reporting of operating difficulties, followed by the proper correction of such difficulties, is constructive and will result in lightening his actual duties, as well as increasing his prestige within the company.

Automatic compressor stations are here to stay. Present reliability of the mechanical equipment and of control equipment required in such stations is excellent and is improving from year to year. Costs for maintaining constant human attention at any station have increased very substantially during the past several years, and may or may not increase in the future. In any event, the present margin of savings in operating cost appears to justify the use of unattended stations in sizes up to at least 2,000 hp. where infrequent shutdowns of the station are not too undesirable.

*Evening view of Shell Chemical Manufacturing Co.'s Stanlow installation. England's newest plant for producing petroleum-derived chemicals. The plant is integrated with the facilities of nearby Shell refineries. It has a capacity rating of 16,700 bbl. daily crude-oil input*

# SHELL'S STANLOW PLANT

## is England's newest installation for producing petroleum-derived chemicals. Plant has design capacity of plus 20,000 tons of solvent materials annually

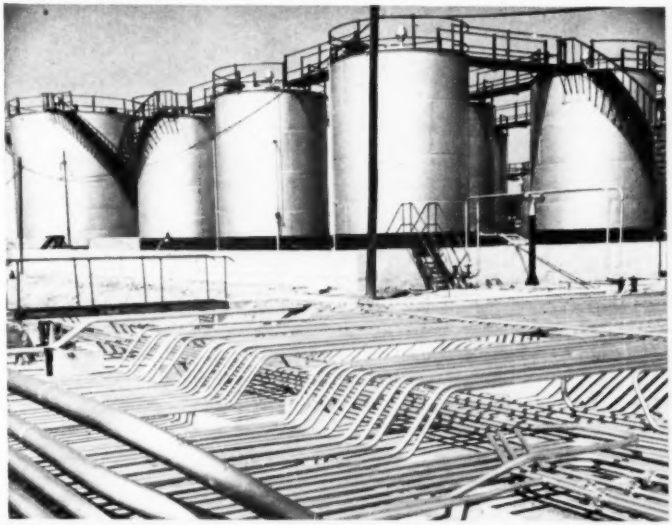
ENGLAND'S newest plant for producing petroleum-derived chemicals, Shell Chemical Manufacturing Co.'s Stanlow installation, is designed to yield from 20,000 to 24,000 tons of solvent materials annually. Currently the plant operates on gas oil, the raw charge stock, which is thermally cracked to obtain two separate stream mixtures of propane-propylene and butane-butylene. The raw charge stock is now obtained from sources outside of the new chemical plant. With the completion of Shell's adjacent Stanlow refinery project, the $C_3$ and $C_4$ materials will be supplied directly to the plant from normal operations of the new refinery. This arrangement will release the chemical plant's existing thermal cracking facilities to other service.

Like Shell's chemical-manufacturing facilities in the United States, Stanlow chemical-plant operations are integrated with those of nearby Shell refineries. The Stanlow refinery, which will be tied into chemical-plant operation, will process chiefly Middle East crude oil. This refinery is rated nominally at 16,700 bbl. daily crude-oil input. The other refinery in the group has a capacity rating of 16,000 bbl. of crude oil daily. However, this smaller-capacity refinery will not be tied in directly with operations of the chemical plant since it is not equipped with suitable facilities for gas-oil or other heavy-oil cracking.

Erected at a cost in neighborhood of $16,000,000, design of the chemical plant incorporates a large variety of the latest devices for automatic control of its operations. Exclusive of cracking, the plant processing facilities consist principally of a hydrocarbon fractionating unit, purification process, distillation unit, converters, acid concentration equipment, and synthesis plant.

Basically the plant is designed to produce seven solvents from the $C_3$ and $C_4$ streams. Propylene obtained from the $C_3$ stream is processed to yield isopropyl and diacetone alcohol, isopropyl ether, acetone, and methyl isobutyl ketone. Butylene from $C_4$ is the charge stock for the operations in which secondary butyl alcohol and methyl ethyl ketone are derived. Any one of these seven basic products may be subjected to further processing to produce any number of a variety of petrochemicals as dictated by market conditions. Operations of the plant are on a continuous basis em-

*(Continued on page 67)*



*The tank farm built for the products of the new solvents plant is fed by an intricate maze of pipe lines leading from the various production units*

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# DYNAMOMETER CHARTS

*and*

# WELL WEIGHING

**by L. W. Fagg***

**Because of elasticity of sucker-rod strings and other variable and often indeterminate factors encountered in oil-well pumping, it is difficult to predict the action of a rod pump while in the well or to recognize pumping troubles. The dynamometer provides a chart or graph of the surface reflection of pump action at the bottom of the hole. Examples and explanations of some of these dynamometer cards are given with this article.**

THE polished-rod dynamometer is recognized as a necessary tool for measuring loads, torque, and horsepower on pumping units. It is also used to determine pump action and trouble shoot for any seemingly abnormal pumping condition.

The apparently infinite variety of dynamometer cards that can be obtained from one well is one reason for the general lack of usage of the dynamometer as a control instrument. When it is considered that the dynamometer card is a record of the resultant of all forces acting on the polished rod at any particular instant during the pumping stroke, the problem is then one of breaking down this resultant into its various components.

### Making the Well Study

It is obvious that it would be impractical to consider in detail all of these factors each time a well study is made. For this reason it is important that some objective be established previous to the time the well study is made.

In general the primary objectives are: (1) Information to be used as a basis for design of new installations; (2) factual data to be used as a means for analyzing equipment failures; (3) information necessary for proper control and efficient pumping operation.

In order to satisfy the first consideration, design calculations should be checked against dynamometer cards taken under comparable conditions. The pumping unit is usually designed to meet the maximum demand that will be expected, whether this be in the first or last stages. The bottom-hole pump and sucker-rod string, being more easily replaceable, are generally designed to meet the operating conditions anticipated for a reasonable time in the future.

If equipment failures are causing high operating expense, a bar chart will show failure frequency and serve as a guide when the well study is made. For instance, if most of the sucker-rod breaks are in the top of the string, then a way should be found to reduce the peak load. If the failures are in the sucker-rod joint, then special attention should be given to joint makeup.

### Dynamometer Used for Control

The simplest way to operate the dynamometer efficiently is to take cards at various speeds in order to determine the best load conditions that will give the desired production. Three variables that may be altered to satisfy this condition are speed, stroke length, and pump size. Obviously, there is an optimum condition that will result in the least load and consequently the most trouble-free operation.

In making a well study one of the most important considerations is to get a representative dynamometer card for the normal speed of operation. When it is considered that a well operating at 20 s.p.m. makes approximately 28,800 strokes per day, it is easily conceivable that representative strokes are not always recorded.

A procedure to lessen the possibility of an error of this kind is to take at least three dynamometer cards at intervals of 15 minutes at the normal speed of operation. If these cards repeat or nearly repeat in shape, it is reasonably safe to assume that a representative card has been taken. It is also advantageous to take dynamometer cards at various speeds throughout the considered pumping range so that the well may be operated under the most favorable load conditions.

### Checking for Leaks

After the desired number of dynamometer cards have been taken, a new sheet of chart paper should be installed and the traveling valve checked as follows: The well should be stopped about the center of the upstroke with the stylii released so that the dynamometer is recording. The stroke component cord should be pulled at once. The recorded line represents the weight of the sucker rods plus the fluid weight on the plunger. The string should be pulled at 1 to 2-second intervals and the rate of decrease of load noted. The time required for the load to reach the dead-weight load of the rods will show how fast the fluid is leaking by the plunger or traveling valve.

It is impossible by this method to differentiate between a leak in the traveling valve and fluid leakage past the plunger. The rate at which the load will equalize is dependent upon plunger clearance and depth to the pump, assuming the traveling valve is holding. Experience in making tests of this kind in conjunction with inspecting pumps that have been pulled will show when a pump is worn to the extent that it should be repaired or replaced.

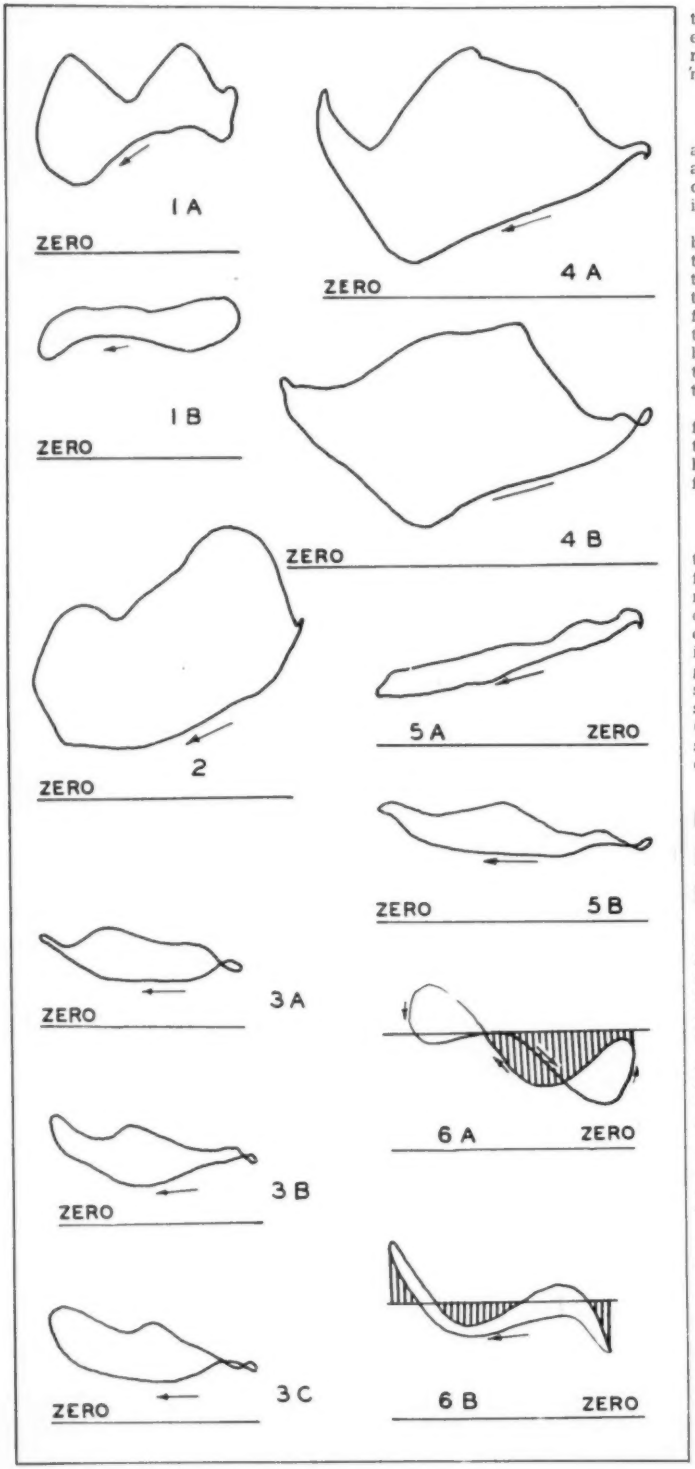
### Checking the Standing Valve

The standing valve may be checked for leaks in a similar manner as that used in checking the traveling valve except the well is stopped near the end of the down stroke when the traveling valve is open and the standing valve is closed. The stylii are released on the chart paper and the stroke component cord pulled. This line will represent the dead weight of the rods in fluid. If the standing valve is not leaking this load line will remain in the same position. A leaking standing valve will show a build-up in load on the polished rod under the above conditions.

### Checking Tubing for Leaks

The same procedure used for checking the standing valve should be followed, but in addition the bleeder valve should be opened to determine whether the fluid is falling in the tubing. If by means of the previous test it is shown that the standing valve is not leaking and yet the fluid level is dropping in the tubing, it is evident that the fluid must be leaking through the tubing. The rate at which

*Johnson-Fagg Engineering Co., Tulsa. Summary of paper presented at the Columbus and San Antonio meetings of the petroleum branch, American Institute of Mining and Metallurgical Engineers.




the fluid drops in the tubing is generally not fast enough to register a noticeable load change on the dynamometer.

### Weighing Counterbalance Effect

While the instrument is still in place after taking a dynamometer card, it is a simple matter to weigh the actual counterbalance effect at the polished rod.

If the well is considerably underbalanced the rods will go down when the brake is released. In this case the clamp should be put directly over the stuffing box to prevent the rods from going down. For correct counterbalancing the measured counterbalance effect line should pass through the approximate center of the dynamometer card.

The maximum counterbalance effect must be known before instantaneous torque and instantaneous horsepower values can be calculated from the dynamometer card.

### Records and Well Data

In order to make proper analysis of the dynamometer cards and other information secured at the well it is necessary to have a detailed record of service of the principal components of the pumping system. These should include any major repairs to the engine or pumping unit; a record of sucker-rod and polished-rod failures showing date, depth, type of break (body, pin or coupling) and notations such as pitting due to corrosion or embrittlement due to hydrogen sul-

## Pumping Problems as Diagnosed by Dynamometer Cards

*1—(A) Pumping through packer: maximum load, 19,000 lb.: load range 7,000 lb.: speed, 22 s.p.m.: polished-rod horsepower, 19.1. (B) After unseating packer: maximum load, 14,700 lb.: load range, 4,900 lb.: speed, 23.5 s.p.m.: polished-rod horsepower, 9.9*

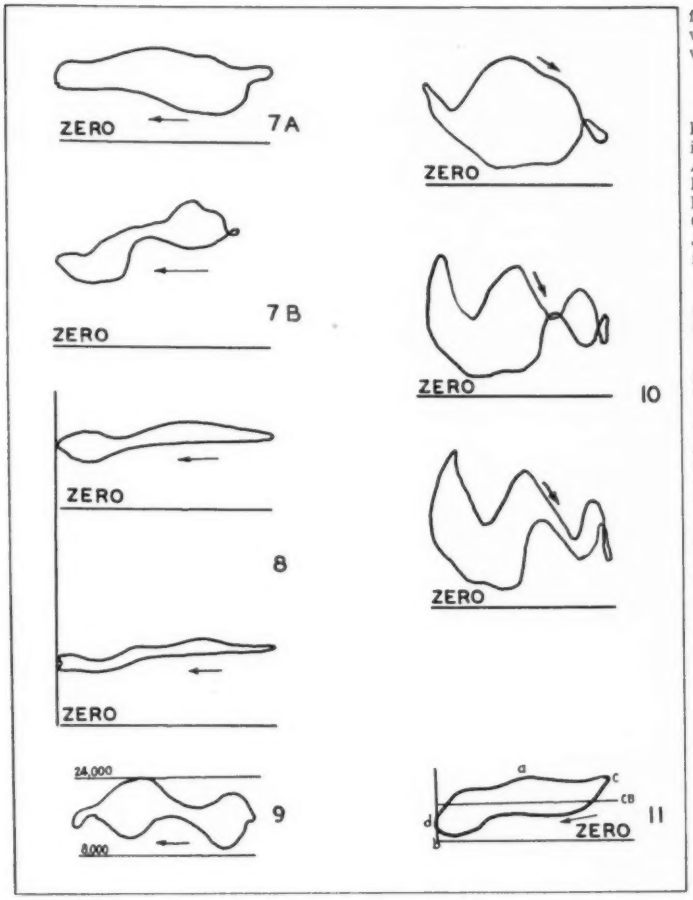
*2—Excessive friction caused by crooked hole. Maximum load, 24,000 lb.: load range, 19,300 lb.: stroke, 54 in.: speed, 21 s.p.m.: polished-rod horsepower, 34.4*

*3—Effect of speed change: A, 16 s.p.m.: B, 18 s.p.m.: C, 20 s.p.m. Polished-rod horsepower, loads, and load range increase with speed*

*4—(A) Dynamometer card before the installation of a dual pump. (B) After the installation of the pump. Load, work, stroke, and speed remained nearly constant*

*5—(A) Before, and (B) after cleaning paraffin out of tubing. Polished-rod horsepower and maximum load both decrease considerably*

*6—Cards of wells agitating and flowing while being pumped. Shaded area shows negative torque*




*7—Typical fluid pound. Apparent volumetric efficiency of (A) is 75.6 per cent, while that of (B), an extreme example of pound, is 35 per cent. Maximum load in (B) is considerably higher than that in (A) although horsepower is less*

*8—Aerated fluid in tubing causes these narrow cards*

*9—Slack in tubing causes this erratic card. Maximum load is 24,000 lb.; speed, 8 s.p.m.; and polished-rod horsepower, 16.8*

*10—Sand passing the pump plunger causes the erratic outline of these cards. Excessive friction in the pump will cause a similarly shaped card*

*11—Method for calculating polished-rod horsepower*

| | |
|---|---|
| *Maximum load, lb.* | *5,150* |
| *Minimum load, lb.* | *533* |
| *Range, lb.* | *4,617* |
| *Speed, s.p.m.* | *12* |
| *Stroke, in.* | *24* |
| *Polished rod horsepower* | *2.06* |
| *Measured counterbalance effect, lb.* | *2,760* |
| *Length of card, in.* | *2.53* |
| *Scale constant* | *5,300* |

*a = maximum load (height scale constant)*
*b = minimum load. Range of load is difference between maximum and minimum load*
*Speed—taken with stop watch*
*Stroke—Measured at polished rod*
*c = beginning of down stroke in direction of arrow (end of up stroke)*
*d = beginning of up stroke. (End of down stroke)*

*Polished-rod horsepower*

$$= \frac{\text{Area of card (sq. in.)} \times \text{scale constant} \times \text{stroke (in.)} \times \text{s.p.m.}}{\text{Length of card} \times 33{,}000 \times 12}$$

$$= \frac{1.35 \times 5{,}300 \times 24 \times 12}{2.53 \times 33{,}000 \times 12} = 2.06$$

*Approximate peak torque:*
*Upstroke = 2,390 × 12 × 1 = 28,700 in. lb.*
*Downstroke = 1,860 × 12 × 0.866 = 19,300 in. lb.*
*Counterbalance should be increased to make up-stroke and down-stroke peak torque equal*

fide; a record of all pump changes with detailed information showing what caused the pump to fail.

**Acknowledgment**

The author wishes to thank the following for a part of the material used in the preparation of this article: A. E. Pierce, Mid-Continent Petroleum Corp.; J. H. Field, Sohio Petroleum Corp.; E. A. Jenkins and Harry Gibbons, Skelly Oil Co.; and D. O. Johnson, Johnson-Fagg Engineering Co.

## Shell's Stanlow Plant

*(Continued from page 63)*

ploying equipment of the very latest design.

To obtain isopropyl alcohol from the propylene-propane stream, the first step in producing the various $C_3$ derived petrochemicals, the mixture is treated with sulfuric acid whereby alkyl esters are formed. The acid-propylene solution is then separated from the unabsorbed propane and hydrolized to produce isopropyl alcohol and sulfuric acid. After treatment, the propane is used as fuel. Separation of the alcohol from the acid is accomplished by steam stripping and product purification is made by distillation. Isopropyl ether results from side reactions occurring in the preparation of isopropyl alcohol.

Acetone is obtained from isopropyl alcohol by employing a suitable catalyzer and carrying out the operation at elevated temperatures. In this process the alcohol is broken down into hydrogen and acetone. By processing acetone in three separate stages methyl isobutyl ketone is produced. In this three-stage operation both diacetone alcohol and mesityl oxide are produced in addition to the end product of acetone. Each processing step yields one of these petrochemicals. In the first stage diacetone alcohol is obtained as a side product and in the second stage mesityl oxide is the secondary product whereas the third stage produces acetone.

The processing methods employed in producing butylene derived chemicals are similar to those used in the production of petrochemicals from propylene. Secondary butyl alcohol is obtained by treatment of butylenes with sulfuric acid and methyl ethyl ketone results from the processing of secondary butyl alcohol. Methyl ethyl ketone may be used as the basic raw material in producing still more synthetic chemicals such as in the case of those derived from propylene.

Engineering talent and equipment from England and from the United States contributed to provide Shell's Stanlow chemical plant with the most modern facilities available today. With its centralized operational control and its processing flexibility the plant is one of the most efficient of its kind to be found in the industry.

# Field Performance of Modern

# Asphaltic Pipe Coatings

by Gordon N. Scott*

COMPREHENSIVE pipe-coating tests[1] have provided a firm foundation upon which modern pipe-coating design rests. Wholehearted cooperation among all agencies which lay a coated pipe line has contributed to improvement in ultimate performance of coating. . . .

The purpose of this report is to show from test and examination what has been accomplished and what further steps can be taken to insure perfect or almost perfect performance of the asphalt-mastic coatings.

The two principal tools employed to study laid coatings and to follow their behavior are: (1) the coating-discontinuity survey; and (2) the coating conductance as determined by a few simple measurements on the gross structure. The conductance of segments of coating is sometimes directly measured in the field or in the laboratory.

### Methods

**The coating-discontinuity survey.**—The coating-discontinuity survey[2] comprises apparatus to impress a signal at audio-frequency on to the pipe line, and to monitor the amplified signal gradients set up in the earth's surface in the coated pipe's immediate vicinity. Where a break, or flaw, exists in the coating, the signal current in the soil enters the pipe through the discontinuity in the coating. Thus the gradient of the converging current is a maximum at a point directly over the discontinuity, and the response of the amplifier is greatest when one of two receiving electrodes on the ground surface is directly over the break in the coating.

Experience is needed to understand the signal fluctuations and to locate flaws in the coating. There are a number of techniques applicable to the survey by means of which the operator is able to surmise something of the nature of the indicated discontinuity. The breadth of the peak signal and the intensity of response are linked to the nature of the discontinuity. Small pinholes in the coating are characterized by the sharpness of the signal peak, whereas larger holes give broader peaks.

Because the signal gradient on a fixed radius is uniform in all directions, the practice of "circling" the discontinuity is useful in confirming its presence. When two or more discontinuities occur at a separation within the span between the operator and his helper, the monitored signal lacks the definiteness characteristics of the isolated discontinuity. These discontinuities can often be separately located by the operator if he walks over the pipe with his helper at right angles to the pipe line. More complex arrays of discontinuities can be studied by plotting the intensity of signal over an area.

Two difficulties usually encountered in a survey are: (1) interference of the signal by audible tones impressed on the pipe line by adjacent power-transmission lines; and (2) inability to establish good electrical contact with the ground. The first difficulty can always be overcome by use of ample power, or by use of a signal frequency (1,000 cycles) outside the range of the accidental tones or by interrupting the input signal. The speed of traverse is normally such as to make possible passing over a discontinuity if the period of interruption is as long as a second. The second difficulty is the many conditions which prevent contact with the ground, viz.: plowed fields, loosely matted grasses and reeds, heavy vegetation, freshly fallen snow and iced waters, surfaced and hard-surfaced dirt roads, dry gravel on river banks and in beds. On the other hand, successful surveys can be effected in the rain, through bodies of shallow water which can be waded, and over river crossings and salt-water bays by use of boats from the bow and stern of which the electrodes are suspended. The apparatus is applicable in metropolitan districts because of paving. Notes taken on such areas become part of the record, so that resurveys may be made under more favorable conditions, or other means may be employed to test the coating.

**Coating conductance.**—Other electrical tests can be employed to define the condition of the coating. These tests do not show the presence of minute imperfections in the coating as Pearson's apparatus does, but they can be used to find major exposures of the pipe and to locate approximately avenues by which large amounts of test current enter the pipe line. Examples of a few such current paths are shorted casings, defective insulating flanges, anchors of suspension bridges, and block gates in contact with the soil in open pits.

The electrical tests can be conducted at any time—even during construction. These tests are easily and quickly made, and thus lend themselves as simple means to follow the performance of the coating with time, and can even be used to determine the need for a coating-discontinuity survey. The theory behind these measurements is outlined in the appendix, in which the equations which have been used are developed. . . .

In practice, the conductance of the coating is readily calculated from associated values of current and voltage at the extremities of the span of pipe line of interest. Current from an ordinary lead storage battery is discharged into soil through an electrode laid for the purpose or, more simply, across a conveniently located insulating flange, and is returned to the battery through the pipe line. Associated measurements of current in the coated pipe line and potential, with reference to remote earth at each of the two boundaries of any selected interval of coated pipe, will permit calculation of the attenuation constant and, thus, the coating conductance. Preferably, however, tests at intermediate points are made to make sure that the conductance of the coating is reasonably uniform in the span.

In theory,[3] the reaction of the coated pipe line to the transfer of current between pipe and encompassing soil is ascribed wholly to the coating in terms of the "radial" conductance of the coating in mhos per running foot of pipe. This definition implies that each unit of the coating on the average exhibits a specific property, wholly contained within itself and unrelated to its environment. The concept, although contrary to reality in fact, is of great use in cathodic-protection work, since "radial" conductance and resistance of the pipe, make up the "attenuation constant" or "distributive coefficient" which alone controls the spread of current and voltage along the pipe line.

In practice, the concept is amply

*Pipe-line technologist, Los Angeles, Calif. Summary of paper presented at annual A.P.I. meeting, Chicago.

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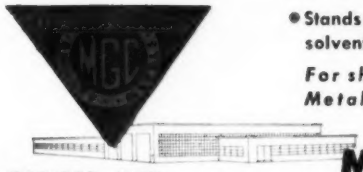


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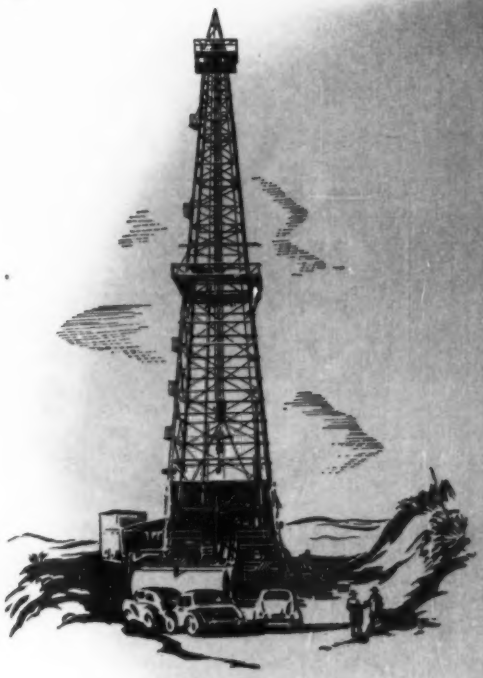

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justified; for, with coatings of low conductance, the pipe line behaves in most instances according to the theory. But, if coatings are to be fairly compared on the basis of their conductance, the environments must be specified and compliance of behavior with theory shown.

These arguments are simply illustrated by imagining the difference of total resistance to earth of an imperfectly coated pipe line transferred, with no change in the physical configuration of the coating, from a soil of high resistivity into sea water. The total resistance of the pipe line will obviously be lower in the highly conductive salt water. Characterization of the coating by means of the "constant," therefore, contains information about the environment in which it was evaluated. Thus is explained why newly coated pipe lines in unwetted and in unconsolidated backfills or older lines in rocky areas and in dry sandy soils of very high resistivity often show fantastically high unit coating conductances, whereas, an exceedingly good coating in a marine installation may exhibit a discouragingly low conductance.

What is really measured and ascribed to each unit of coating is the average reaction to an input current of a physically imperfect coating in the particular environment in which the coated pipe rests. Accordingly, marked changes with time in the average response of a particular coating is as well ascribed to the soil as to the state of the coating. Every measurement of coating conductance should be accompanied with some information on the environment if comparisons are to be fairly made.

### Field Data

Specific cases illustrating results of the discontinuity survey and the electrical tests follow:

**1. Coating - discontinuity survey.**—In Table 1 are summarized results of eight selected surveys on asphalt-mastic coatings. The meaning of the several classifications will be apparent from the following descriptions, which are largely extracted from summaries of investigations:

Case 1: Most of this right-of-way lies in open, flat, marshy, partly inundated country. The remaining portion passes through rough hilly country, characterized by large rocks and boulders:

> No deterioration of the coating had occurred in the 4.5 years of service. Only five discontinuities in the coating were found. Two were punctures by large rocks at points of excessive bearing; one was damage by a tractor; one was a rupture by scrap iron in the trench; one was a large spalled area.
>
> The pipe examined was in new condition, except for moderate pitting at one location where the coating had been damaged by the tractor.

At 12 locations where discontinuities were indicated, the cause of indications was pairs of insulated copper wires 100 ft. apart which had been installed for test purposes; four pairs were not recorded on the pipe-line drawings—a demonstration of the equipment's sensitivity. Similarly, the survey located and, without benefit of excavation, identified an insulating flange in the line and indicated discontinuity proved to be grounding rod of a transformer case.

Fifteen measurements of the conductivity[1] of coating on foot lengths of pipe selected at random at seven locations ranged from 0.046 to 0.335 (average of 0.197) micromhos per square foot of pipe surface.

It is clear that a mere count of discontinuity "indications" is no basis for judging the coating's condition; and a traverse which is not followed by inspection is of limited value. Actually, in this particular investigation, many stakes had been set for one reason or another in the area covered by the report. Of these staked indications only five located imperfect coating.

Case 2: The terrain through which this right-of-way passes is flat, and the soil is highly corrosive:

> All but two of the discontinuities were uncoated or poorly coated air vents, water vents, or seepage dams. At one location skid-damaged coating had been laid unrepaired. At the other location the coating was punctured by the root-like rhizomes of "desert salt grass" which also penetrated the soft coating at five of the uncoated vents and dams. Field patches were excessive in asphalt content, and were consistently of unsatisfactory workmanship. The plant coating, mildly stressed by the soil and otherwise deformed in a few locations, was in good condition.
>
> The coating was high in electrical resistance, and the pipe line was free of long line currents—strong evidence of satisfactory performance of the coating.
>
> The pipe was not pitted except at two locations, where it was exposed. The pipe was lightly rusted or etched where the coating was penetrated by rhizomes.
>
> The performance of the coating-continuity locator was satisfactory over 90 per cent of the right-of-way. Over the remaining 10 per cent, difficulties in operation were experienced. . . .

The distortion of the mastic and the rhizome penetrations indicate too high an asphalt content in the mix. . . . The asphalt content in both machine and hand applications is now controlled by automatic metering of ingredients at the plant and by proper instruction of field personnel.

Notwithstanding failure on two traverses to locate five uncoated vents, reliance may be placed upon findings of the coating-discontinuity locator. Two of these failures can be explained as operator's errors. Uncoated metal dams, welded to the pipe line on each side of a canal crossing, created extensive gradients of high intensity in the shadow of which were the two undetected vents. Three undetected vents lie within a short span which is hard to traverse, in which additional coating discontinuities may exist. The true sensitivity of the apparatus is demonstrated by its ability to respond to a defectively coated vent where no break in the coating was obvious.

Notwithstanding the high number of discontinuities located which are attributed to faulty plant and field practices, the asphalt-mastic coating on this line was performing satisfactorily.

Case 3: The right-of-way for the line in this case passes through flat and open land, most of which is cultivated. The soil is corrosive:

> Five of the discontinuities were uncoated areas at the end of the machine-applied coating adjacent to field joints. The sixth was cracked coating. The examined coating was in good condition, except where cracked at the one location. There was no soil-stress deformation. The whitewash was largely well preserved. The examined pipe was in good condition. Rust, with possibly some etching of the metal, was found at only one location.

With the exception of a few thousand feet, the right-of-way passes through hay fields. The hay had been harvested, which permitted the top soil to become well dried out over the last few thousand feet of the traverse where, accordingly, the quality of the survey was unsatisfactory.

Aside from the five uncoated areas which should have been caught by the inspector during construction, the asphalt-mastic coating was obviously performing satisfactorily.

Case 4: Most of this right-of-way lies in flat country, which is flooded for agricultural purposes from October to August; 2.6 miles of right-of-way was too deeply flooded to be traversed on foot:

> Nine discontinuities were detected. Of these, four could not be inspected because the right-of-way was flooded; three were coating-disrupted by the blade of a grader; two were coating-softened by oil. Although operating oil temperatures range from 110° to 150° F., the coating was free of soil-stress effects; was uniformly distributed about the pipe; and had in no way deteriorated.
>
> The examined pipe was in good condi-

**TABLE 1—DATA ON SOME COATING-DISCONTINUITY SURVEYS**

| Case No. | Inspected | Age (years) | Size (in.) | Mileage | Errors of construction | Damaged | Faulty coating | Unclassified | Total |
|---|---|---|---|---|---|---|---|---|---|
| 1. | April 1944 | 4.50 | $6^5/_8$ | 29.7 | 5 | | | | 5 |
| 2. | May 1944 | 2.75 | $10^3/_4$ $12^3/_4$ | 3.50 | 22 | 1 | | | 23 |
| 3. | May 1944 | 2.00 | $8^5/_8$ | 3.53 | 5 | 1 | | | 6 |
| 4. | January 1945 | 5.50 | $8^5/_8$ | 8.90 | | 5 | | 4 | 9 |
| 5. | April 1945 | 1.10 | $6^5/_8$ | 25.70 | 1 | | | 1 | 2 |
| 6. | May 1945 | 1.10 | $6^5/_8$ | 9.67 | 1 | | | | 1 |
| 7. | April 1948 | 2.00 | 18 | 100.17 | 15 | 9 | 3 | 1 | 28 |
| 8. | May 1948 | 0.60 | $6^5/_8$ | 4.24 | 1 | | | | 1 |
| | | | | | 50 | 16 | 3 | 6 | 75 |

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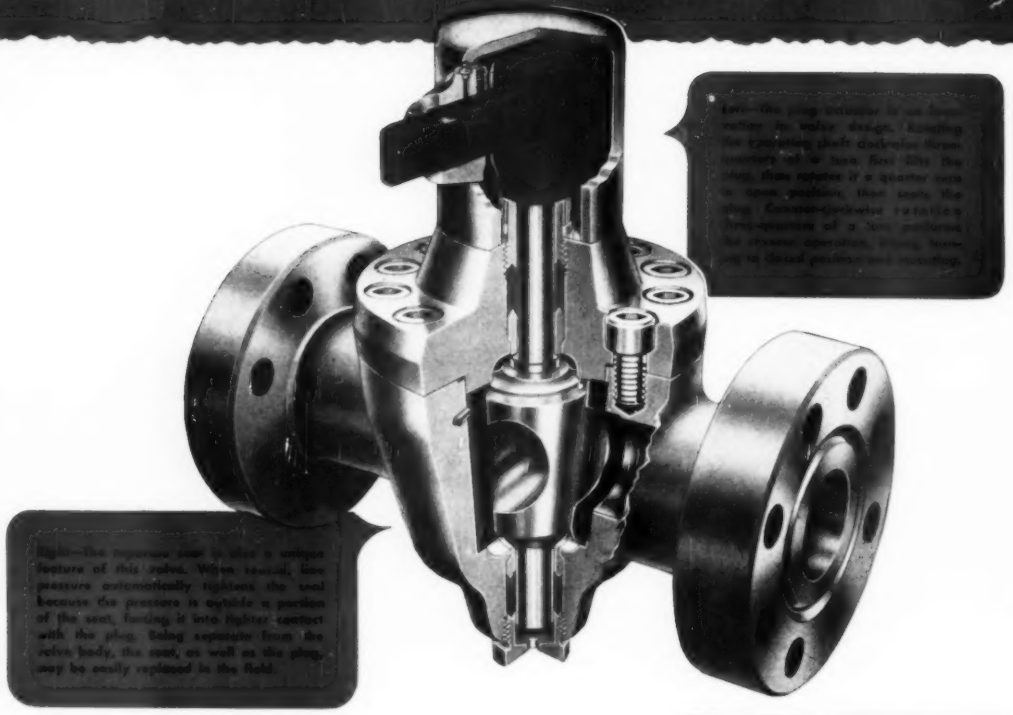

The Cameron Non-Lubricated Type "LP" (Lift-Plug) Valve presents a revolutionary approach to the problem of quality valve design. It combines the advantages of recognized plug, gate, and globe valves, and eliminates the generally recognized difficulties of the standard valve designs.

Need for lubrication, which is essential to the operation of the usual plug valve, and generally accepted as an improvement in gate valve design, is eliminated in the "LP" Valve for two reasons: First, a complete seal is effected when the valve is shut, because a portion of the exterior surface of the removable seat is exposed to pressure, thus permitting a pressure sealing action; and secondly, the plug is lifted straight away from the seat before rotation to prevent scoring or galling of the seating surfaces. In addition to eliminating the need for lubrication, the pressure sealing action of the seat and plug forestalls many of the difficulties experienced with conventional designs in all types of valves where distortion of the body due to pressure, temperature, or line strains ordinarily cause imperfect sealing.

The lift and turn mechanism incorporated in the valve not only acts to eliminate the need for lubrication but makes possible an extraordinary ease of operation, since operating effort goes first into lifting the plug straight off the seat, then into turning it while free from contact with the seat, and, finally, reseating without rotation.

In all pressure ranges, the plug rotates in accurately aligned bushings to effectively prevent contact during rotation of the sealing surfaces. Since the seat is a separate piece, which may be removed from the body, it is perfectly feasible to replace both the seat and plug in the field under ordinary conditions. The separate seat and plug are normally furnished in corrosion resistant materials, and may be supplied from almost any material as required for unusual corrosive or erosive service.

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tion. Rust or only mild etching was found at the five discontinuities inspected.

The conductance of the coating was measured on six 1-ft. lengths of coated pipe selected at random. These six measurements ranged from 0.0011 to 5.50, with an average value of 1.64 micromhos per square foot.

Case 5: The pipe line passes through flat cultivated land, part of which is irrigated.

Two discontinuities were detected. One was a puncture by a trenching-machine tooth. The other was skid-ruptured. No rust was found on the pipe. Some difficulty was experienced in operating the detector in plowed fields and where the soil was hard-packed and dry.

The coating, where examined, was in good condition. Inspection of the coating, at time of laying, appears to have been particularly good because only the one discontinuity, caused by a skid, could have been corrected during construction.

Case 6: The terrain along the pipe line is generally flat and open. Approximately half of the right-of-way lies in unimproved alkali land; the remainder is under cultivation:

One discontinuity, a 14-in. uncoated pup joint, was detected. The coating adjacent the pup joint was in good condition. The bare pipe was rusted on the bottom and next to the welds. There were areas of metal attack and some shallow pitting.

Case 7: The pipe line, 100 miles of which was coated with asphalt-mastic coating, runs through rolling, hilly, and flat country. The asphalt-mastic coating was laid where the soil was most corrosive; another type of coating was applied in the less corrosive areas.

Discontinuities attributed to construction errors include: a small chisel-cut area; tracks of a caterpillar across the coating; coating struck with a metallic bar, knocked off pipe, gouged by field-joint equipment; poor field-joint coating; omission of a field joint. Many of the field joints on this pipe line had been applied by means of a pressure field mold which was then still in the experimental stage. Records of the coating inspection indicate that probably 8 out of the 15 "construction errors" are attributable to failure of pressure mold or its handling.

Case 8: The pipe line lies in a mountainous area, where construction difficulties were at a maximum. Because of concern over the continuity of the coating, which could easily have been damaged and undetected in the haste and difficulty of construction, tests were conducted shortly after the trench had been backfilled. A single discontinuity was found at a dirt-road crossing where a grader blade had caught and stripped, for approximately 2 ft., a field joint. Corrosion had already started where the pipe had been laid bare by the scraper blade.

**2. The coating conductance.**—Case A: In Fig. 1 are shown companion current and potential measurements over 10 miles of a machine-applied asbestos-fabric-wrapped asphalt coating on an 8⅝-in. pipe line. The terrain is mostly flat and under agriculture, but no irrigation. The tests were run in July 1946—using a typical cathodic-protection setup. In the region shown, there were five casings, a block gate, and a river crossing where the river clamps were uncoated. The data are so few that close determination of the amount of abrupt current gain, if any at all, of the possibly shorted structures in the pipe line is not possible. Such pickup of current, which results in a discontinuous curve, is most clearly shown at the railroad crossing about 3½ miles from the point of drainage, and it is also indicated at certain other points. There are corresponding breaks in the potential curve which show changes in slope at these points.

The coating conductance is determined from the data in each range where the current curve is unbroken. The average value is shown in the last column of Table 2.

In preference to detailing the several estimates of the conductance of the coating leading to the average in the table, figures from another 10-mile section of this pipe line will be used to show the constancy of the coating conductance. In Table 3 are shown the "effective resistance" of the coated pipe line, and associated soil resistivity. The effective resistance of a uniformly coated pipe line of "infinite" extent in a uniform environment is independent of the point of measurement, and is thus a constant. . . .

Case B: Prior to test the pipe line was traversed with the coating-discontinuity locator, with the results described in case of the preceding section. About half of the pipe line lies in lowland soils so highly alkaline as to be unsuitable for agriculture.

*(Continued on page 80)*

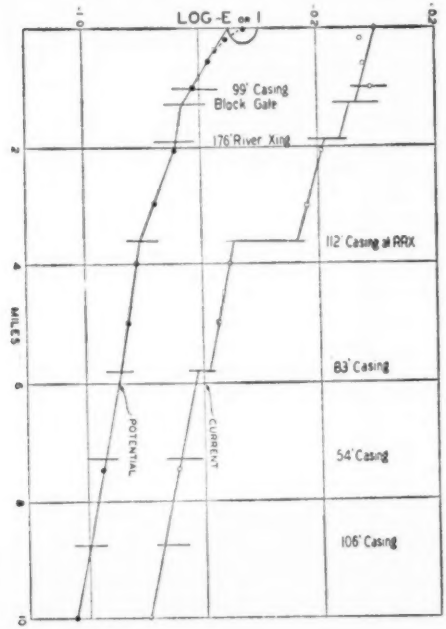
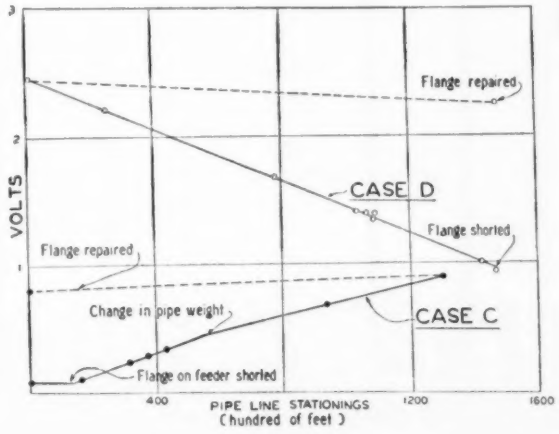



*Fig. 1—(Left) Typical current and voltage distribution along 10 miles of an effective asphalt-coated pipe line: Gain of applied current at shorted casings and other appurtenances is shown by the continuous current curve, and less markedly by the broken potential curve. Fig. 2—(Below) Voltage distribution along asphalt-mastic coatings of low conductance: The easily made measurements served to calibrate the pipe for resistance, to locate defective insulating flanges, and to calculate the coating conductance*



# TIME FACTOR IN Cementing

by Bruce Barkis*

PRIOR to the development of the gun perforator, and its introduction on the Gulf Coast about 1935, casing was cemented above the productive sand. The securing of an effective cement seal around the bottom end of a casing string for this type completion was not as difficult as attempting to exclude gas or salt water from a productive oil section several hundred or several thousand feet above the cementing depth.

As the gun-perforated type of completion developed, it was found necessary to squeeze cement through the primary perforations to exclude gas or salt water which entered the well because of cementing failures. The art of squeeze cementing was improved through the development of cement retainers and removable cementing tools, and this practice is still used in certain areas.

Scratchers were introduced on the Gulf Coast in 1940 and during the past 10 years have been accepted by the oil industry for improving cement placement and the percentage of cement fill behind the casing. Centering of the casing is provided by the use of spring bow centralizers.

*B & W, Inc., Houston. Paper presented at Texas A. & M. College meeting of Texas sections of A.I.M.E.

The transition from squeeze-cementing technique to improved primary cementing has brought about a general review of the entire cementing operation. This has resulted in the development of rig practices, improved blowout preventers and cementing heads and other time-saving items which have speeded up this critical phase of oil-well drilling.

This time study of the cementing operation was made to determine (1) the time required for each phase of the job, (2) whether any considerable saving in time might be made, and (3) the effect of delays, or stoppages of casing movement, on the success of the job.

### Phases in Cementing

The several phases of the oil-well cementing are reviewed in their operational sequence.

**Laying down drill pipe.**—It is customary on the Gulf Coast to lay the drill pipe down as the drilling string is pulled for the last time before running casing. One side of the casing rack is usually reserved for drill pipe, and various improvements have been made in the technique of breaking the individual joints and laying down the several hundred units comprising the drilling string. There is small room for improvement in this standard operation and the general average of 2,000 ft. per hour is only varied by the rig crew's ability and working conditions.

**Scratcher installation.**—Drill pipe is usually rerun to bottom, after the electrical log and caliper survey or side-wall cores have been taken, to condition the mud preparatory to running casing. Scratchers are most often installed on the casing during this period. From the electrical log, the uppermost productive sand is located, and the standard pattern shown in Fig. 1 extends from the casing shoe to above this depth.

An analysis of 100 recent casing jobs showed that an average of 840 ft. of scratchers were installed. On Range 3 casing, averaging 40 ft., this would indicate that 21 joints were covered. These joints should be placed on 4-in. skids on the upper row, and sufficient working space should be provided. The scratchers are placed at selected intervals, usually two, three, four per casing joint, and welded lugs spotted about 1 ft. on each side of the scratcher to restrict its travel and to provide sufficient space for slip removal without reversal as each joint is raised from the rotary table or casing spider.

For the average job shown above, the time required for installation would be about 3 hours. Lifting tools for raising the casing joint, adequate working space, good planning, and a fast welder will shorten the time required for installation. Three lugs are usually placed above and below each scratcher. If joints are rolled closely together, after the scratchers have been installed, a welder may place two of the upper lugs and two of the lower lugs, above and below each scratcher without moving any of the casing joints. All joints should then be rolled over 180° and the third lug placed above and below each scratcher. This suggestion has often reduced welding time by at least 50 or 60 per cent.

Solid collar centralizers should be installed while the casing is on the rack, but hinged centralizers may

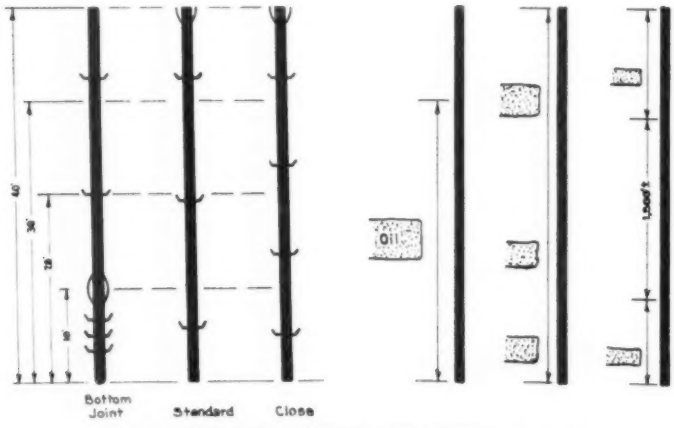



*Fig. 1—Scratchers and centralizers installation (Range 3 casing)*

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be installed on the rack or at the rotary table as casing is run.

### Rigging Up to Run Casing

A great deal of work is required to make proper preparation for running casing. The addition of individual joints to the casing string is an operation of constant repetition, and the saving of seconds on each joint results in a saving of hours for the entire job. More men should be used than in the normal rig crew and it is customary for crews to "work over" or to bring in a crew of specialists to provide the additional manpower.

Details of rigging up include casing-thread-protector loosening or removal, measurement of the upper row of casing, making and installation of spinning and lifting lines, hoisting of stabbing board, and connecting and hanging of the flexible mud-filling line. Close supervision during this period is necessary for the enlarged crew to prevent breakdowns or other delays during the actual running of the casing.

### Cellar Connections

A portion of the regular or casing crew is used to make the necessary changes in the cellar connections. Certain blowout preventers require changing of the inner assembly to provide a seal for the casing rather than the drill pipe which was used during the drilling operation. Improvements have been constantly made in these assemblies and the necessary changes can now be made during the rigging-up period. Use of equipment which requires an extended period for changing inner assemblies is not recommended.

### Running Casing

There is a competitive challenge in running casing, and almost every crew tries to boost its former record.

No other rig operation requires the perfect team work of the casing crew. An experienced crew observes all safety rules and good supervision sees that safety is never sacrificed for speed.

The development of the round thread, use of a spinning line, improved hoisting equipment, and better facilities for filling the casing joints have speeded up the casing operation. Average running time for 5½ or 7-in. Range 3 casing on the Gulf Coast is 1,000 ft. per hour. Assuming an average length of 40 ft. per joint, this indicates that slightly over 2 minutes is required for handling each individual joint. This time factor can be used to indicate running time for Range 2 casing or other types of casing joint.

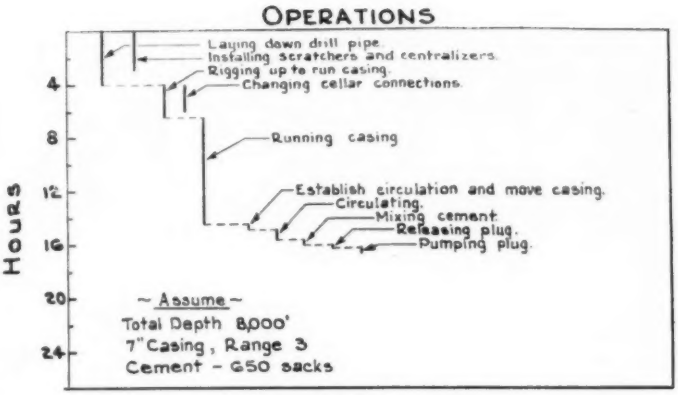


*Fig. 2—Time schedule in cementing*

The availability of casing during the past year has influenced the selection, but a recent survey shows the following oil strings were run on 100 recent jobs:

| | | |
|---|---|---|
| 5 -in.—4 | 6 -in.—1 | 7 -in.—55 |
| 5½-in.—36 | 6⅝-in.—1 | 7⅝-in.— 3 |

and that the casing joints were:

| | | |
|---|---|---|
| Range 1—1 | Range 2—40 | Range 3—59 |

Displaced mud circulation, provided by the use of a float collar or shoe on the bottom of the casing string, assists in conditioning the annulus as the casing is run. The volume of mud displaced as each joint is lowered is a constant check on the condition of the mud fluid and hole.

### Actual Cementing Operation

**A. Circulation and movement of casing.**—The establishment of circulation and the movement of casing as soon as bottom is reached, make possible the continued movement of casing during the entire cementing operation, which is necessary to provide mud filter-cake removal just as the cement slurry is passing the critical productive sections.

An analysis of the job reports submitted on an even hundred casing cementing operations shows the following:

| | Hookup time | Mud circulation | Sacks cement used | Sacks cement per min. | Install plug | Pump down |
|---|---|---|---|---|---|---|
| Maximum weighted average | 54 | 93 | 1,500 | 30 | | |
| Average | 19 | 44 | 644 | 19 | 5 | 25 |
| Minimum weighted average | 5 | 15 | 163 | 11 | | |

The chart (Fig. 2) shows that while it is possible to establish movement and circulation in as short a time as 5 minutes, the average time required is 19 minutes, and as much as 54 minutes is often required. The detailed record shows that the hazard of "freezing" casing increases as the time increases. Of the 100 jobs, 10 casing strings were frozen. The "remarks" on each of these jobs is important and are listed:

1. Took 25 minutes to fill, with casing 1 ft. off bottom. Froze.
2. Well tried to blow out while circulating. Froze.
3. Seven-inch at 10,000 ft., casing on bottom for 23 minutes while installing head. Froze.
4. Casing froze while installing plug.
5. Casing froze while installing cement head. Elevators 1½ ft. above rotary table.
6. Seven-inch at 10,072 ft., casing froze while installing bottom plug.
7. Casing froze while releasing bottom plug.
8. Casing froze while checking whether bottom plug was released from retainer head.
9. Casing froze while installing head. Casing only 1 ft. off bottom at 10,000 ft.
10. Five and one-half-inch at 12,459 ft., casing froze while connecting up and installing head.

Since movement of the casing is essential to mud removal and better cement placement, it appears that improvement of our derrick-floor practices for connecting up the cementing lines, installing the cementing head and releasing the cementing plug to reduce the number of frozen strings of casing are necessary.

**B. Mud circulation.**—The average time shown on the chart for circulating mud fluid after casing reaches bottom is 44 minutes. The general rule has been adopted by some companies of pumping a fixed percentage more than sufficient to fill the casing, while others circulate long enough to observe returns from bottom. The average figure shown is an indication that the shorter circulation period is more popular.

**C. Mixing cement slurry.**—The

chart also shows an average cement mixing rate of 19 sacks per minute, the maximum rate being 30 sacks per minute and the minimum rate being 11 sacks per minute. The chart also shows that an average of 644 sacks of cement per job is used. These figures indicate that the average mixing time per job is 34 minutes. A mechanical cement mixer has recently been used on several Gulf Coast jobs and mixing rates of 43 sacks per minute have been reported. Increased mixing rates will not only speed up the whole cementing operation, but will aid in keeping the casing full of cement slurry, and prevent the formation of air pockets to contaminate or interfere with proper cement placement.

**D. Installing plug.**—If the movement of casing is stopped, at any time after the casing string reaches bottom, there is a possibility that it cannot be moved again. The use of a plug retainer-type cementing head has the advantage over the total or partial removable type of allowing the plug to be released without opening the casing to allow the admission of considerable amounts of air, and without setting the casing in the slips or releasing the elevators. Releasing the plug and changing the valves, with the retainer-type cementing head, requires only a few seconds and can be done while the casing is still in motion.

The job analysis indicates an average of 5 minutes was required for installing or releasing the plug. Several casing strings were frozen during this critical period. The detailed record also shows that the movement of casing was stopped, on several jobs, while the cement was being mixed, and on several other jobs, no effort was made to move the casing after the plug was installed.

**E. Pumping down.**—The rig pumps are used, in most cases, to displace the cement slurry. Fluid velocities are at a maximum during this period because of the added weight of the cement column inside the casing.

The chart shows that cement is displaced on the average job in 25 minutes. This includes the time for the cement slurry to reach the casing shoe, the period up to equalization, and the pressure phase while the cement is entirely displaced from the inside of the casing.

### Conclusion

The total elapsed time required between casing reaching bottom and final displacement of the cement slurry, for the average of 100 casing jobs was slightly over 2 hours. A movement cycle of about 2 minutes for the upward and downward travel of the casing indicates that about 60 strokes are made during entire job.

This time study indicates no large saving can be made in rig time, but the saving of a few minutes during the critical period when the casing reaches bottom, and later as the cementing plug is released, are of extreme importance. A well-planned program will provide closer synchronization of the movement of the casing with the travel of the cement slurry, around the bottom of the casing, and aid in increasing the percentage of successful cementing jobs.

## Sohio's Refinery

*(Continued from page 53)*

each of which gives access to one type of equipment. The road on the western battery limit adjoins the blower building whose west wall is removable to pass the heaviest items of blower or motor equipment. The next easterly road parallels the catalyst structure and is overhung by trolley beams at various levels for direct removal of equipment to trucks or trailers. The center road traverses the indoor and outdoor pump installations and will be used on turnarounds, exclusively for pump service. The next road to the east is completely spanned by a movable Gantry crane still allowing overhead clearance for trucks. This crane, equipped with a trolley beam system, will handle all ground-level gas-plant heat exchangers.

Overhead condensers, also on this


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roadway, are equipped with block valves and swing blanks which allow bundles to be pulled and serviced while the unit is on stream thus eliminating this phase during turnaround. The overhead trolley beams which serve these above-grade units, span the roadway. The road on the eastern battery limit adjoins the gas-compressor house which it serves exclusively. This road is free of all overhead lines, allowing the unhampered use of a long-boom mobile crane. The crane may be used for removal of any sizable equipment pieces from the catalytic structure, which are not handled by the permanent hoists and trolleys installed for lesser items.

Mechanical handling is provided throughout the unit. The blower house has a 10-ton box crane which was used in initial installation of blowers and motors. In addition to the hoists and trolley beams serving the slide valves, expansion joints, relief valves, and similar equipment on the main structure, a large elevator will find use in moving many additional items during turnarounds. This 8 by 12-ft. Otis unit serves 10 levels, is of 7,000 lb. capacity, and travels at 200 ft. per minute.

The gas-compressor house, of steel and corrugated transite, has an operating floor 6 ft. above grade. This allows at-grade manifold installations of suction, discharge, and service lines outside the building. Lines to compressors are installed in the open space under the building. The building proper, equipped with four large roll doors facing east, is also kept open to natural ventilation except during the most severe weather. The trolley-and-hoist system in this building is so designed that equipment from compressors and auxiliaries can move directly to and from the truck-loading ramp extending along the east side of the building.

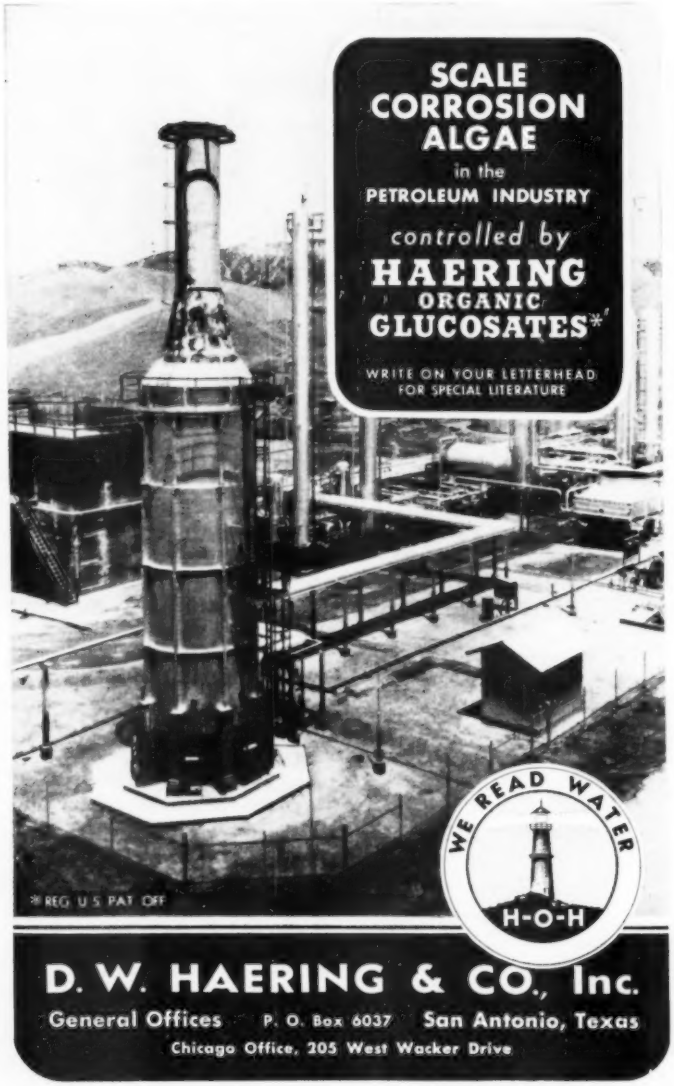
A new 140 by 340-ft. central shop building houses all maintenance crafts as well as warehouses, offices, and lockers. Depressed railroad and truck ways allow loading and unloading by the bridge crane at floor-level docks.

Both the fluid cat cracker and the crude coker are highly electrified and standby units are steam powered. To handle this additional load a new electric substation has been built apart from the process area. Purchased electric power will be available from two separate sources to reduce the possibility of power failure. All switchgear serving motors in the new process units will be concentrated in this substation.

### Solvent Lube Plant

The completely new 76,000-gal. per day solvent lube plant at Lima represents the refinery's first entry into major lubricants production. Four of the five process units of the plant were designed and are being constructed by Lummus Co. The propane deasphalting unit was designed and is being constructed by M. W. Kellogg Co. Charging 40 per cent reduced Illinois crude, the 9,000-bbl. per stream day vacuum distillation unit will make the following fraction cuts: gas oil overhead, paraffin distillate sidestream, intermediate distillate sidestream, cylinder stock sidestream, and short residue bottoms.

Paraffin distillate, intermediate distillate, vacuum cylinder stock, and deasphalted cylinder stock from the short residuum cut, will be successively furfural refined, dewaxed, and clay contacted to finished blending stocks. A mixture of the vacuum cylinder stock and deasphalted cylinder stock will also be dewaxed only in order to produce a 200 steam-refined oil. The lube plant will be incorporated into general refinery flow for conversion of excess and byproduct streams to fuel stocks. Excess short residuum from the vacuum unit and asphalt removed in the propane deasphalting unit will be charged to the crude coker. Furfural-unit extracts and excess microcrystalline wax from M.E.K. dewaxing unit will be catalytically cracked, as will the vacuum-unit gas-oil overhead and any excess sidestreams.

# QUESTIONS on TECHNOLOGY

**by W. L. Nelson**
Consulting Engineer

## Aniline Point and Other Properties

**I shall be grateful if you will publish a correlation of aniline point, per cent aromatics, and C/H ratio, or direct me to literature.—G. K.**

The relationship between aniline point and other properties cannot be exact unless the sample contains only one or two kinds or series of hydrocarbons. However, the approximate relationship between aniline point, boiling point, percentage of hydrogen or carbon-hydrogen ratio, A.P.I. (or specific) gravity, and U.O.P. Characterization Factor is shown here in Table 1 and Figs. 1 and 2. The U.O.P. Factor is defined as follows:

$$K = (T_B/S)^{1/3}$$

$T_B$ = average boiling point, °F. absolute
S = specific gravity at 60° F.

The basic data for the relationships shown here were taken from "The Modern Cracking Process" by Egloff and Nelson (*The Oil and Gas Journal, July 2, 1936*). The information presented here must be approximate because the proportions of paraffin, olefin, naphthene, and aromatic hydrocarbons are seldom the same in two oil samples.

Aromatic hydrocarbons cannot be obtained directly from aniline points with any accuracy unless the particular aromatic hydrocarbon involved is known and unless the other type of hydrocarbon associated with it is known. For unknown mixtures it is necessary to work with the aniline points before and after the removal of aromatics, thus:

$$X = C(T_2 - T_1)$$

in which:

X = percentage of aromatics in a petroleum fraction
$T_1$ and $T_2$ = respectively the aniline points before and after the removal of aromatics, °C.
C = coefficient (see Fig. 3)

A. N. Sachanen in his book, "The Chemical Constituents of Petroleum" (Reinhold Publishing Corp., New York, 1945), completely discusses the situation and suggests for straight-run petroleum fractions the C values

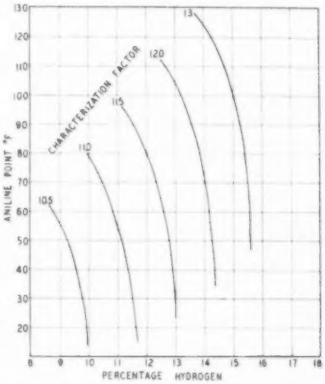



*Fig. 1—Approximate relationship between aniline point, boiling point, and U.O.P. characterization factor*

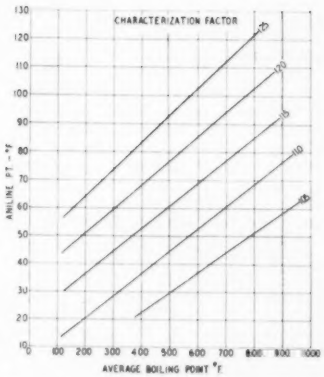



*Fig. 2—Approximate relationship between aniline point, percentage of hydrogen, and U.O.P. characterization factor*

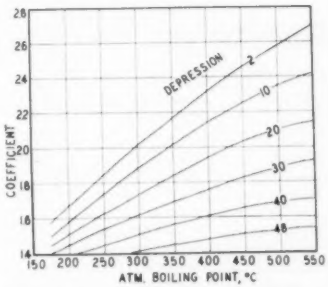



*Fig. 3—Coefficient "C" for straightrun petroleum fractions versus boiling point*

shown in Fig. 3. The errors are said to be under 7 per cent (based on the aromatics) for fractions boiling up to 150° C., and 15 per cent for higher-boiling fractions. However, the percentages or aromatics found by this method, represent only the aromatic hydrocarbons which are removed by the particular treatment with sulfuric acid employed by Sachanen and Virobian (Pet. Ziet. 25, 867, 1929; and

**TABLE 1—APPROXIMATE RELATIONSHIP BETWEEN ANILINE POINT, BOILING POINT, GRAVITY, CHARACTERIZATION FACTOR, AND HYDROGEN-CARBON RATIO**

| Aniline point (°F.) | Average boiling point, °F | | | | | A.P.I. gravity | | | | | Hydrogen-carbon ratio | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | K = 10.5 | 11.0 | 11.5 | 12.0 | 12.5 | K = 10.5 | 11.0 | 11.5 | 12.0 | 12.5 | K = 10.5 | 11.0 | 11.5 | 12.0 | 12.5 |
| 15 | | 130 | | | | | 54.2 | | | | | 7.55 | | | |
| 20 | | 200 | | | | | 47.2 | | | | 9.1 | 7.58 | 6.65 | | |
| 25 | 435 | 260 | | | | 22.9 | 42.1 | | | | | 7.63 | 6.67 | | |
| 30 | 507 | 320 | 122 | | | 19.0 | 37.7 | 63.5 | | | 9.2 | 7.67 | 6.70 | | |
| 35 | 573 | 381 | 183 | | | 15.4 | 33.1 | 57.0 | | | 9.3 | 7.72 | 6.72 | 5.94 | |
| 40 | 643 | 443 | 248 | | | 12.3 | 29.3 | 51.2 | | | 9.4 | 7.77 | 6.75 | 5.96 | |
| 45 | 712 | 507 | 308 | 130 | | 9.5 | 25.9 | 46.3 | 71.2 | | 9.6 | 7.85 | 6.78 | 5.98 | |
| 50 | 784 | 570 | 370 | 190 | | 6.9 | 22.7 | 41.6 | 64.7 | | 9.78 | 7.95 | 6.81 | 6.00 | 5.40 |
| 55 | 852 | 630 | 430 | 248 | 101 | 4.3 | 19.9 | 37.7 | 59.2 | 82.7 | 10.02 | 8.06 | 6.85 | 6.02 | 5.40 |
| 60 | 926 | 693 | 490 | 306 | 155 | 2.0 | 17.0 | 34.0 | 54.1 | 76.6 | 10.37 | 8.20 | 6.92 | 6.05 | 5.41 |
| 65 | | 754 | 551 | 363 | 210 | | 14.7 | 30.8 | 49.7 | 70.9 | | 8.35 | 7.00 | 6.08 | 5.42 |
| 70 | | 818 | 617 | 423 | 262 | | 12.1 | 27.3 | 45.8 | 65.8 | | 8.52 | 7.10 | 6.11 | 5.44 |
| 75 | | 880 | 677 | 480 | 315 | | 9.9 | 24.6 | 42.0 | 61.3 | | 8.75 | 7.18 | 6.16 | 5.46 |
| 80 | | 940 | 740 | 540 | 366 | | 7.9 | 21.8 | 38.5 | 57.0 | | 9.02 | 7.30 | 6.23 | 5.48 |
| 85 | | | 800 | 597 | 418 | | | 19.2 | 35.2 | 53.1 | | | 7.47 | 6.28 | 5.50 |
| 90 | | | 862 | 656 | 470 | | | 16.9 | 32.3 | 49.7 | | | 7.65 | 6.36 | 5.53 |
| 95 | | | | 712 | 520 | | | | 29.8 | 46.6 | | | 7.88 | 6.45 | 5.59 |
| 100 | | | | 770 | 573 | | | | 27.1 | 43.5 | | | | 6.55 | 5.65 |
| 105 | | | | 828 | 625 | | | | 24.9 | 40.7 | | | | 6.70 | 5.70 |
| 110 | | | | 887 | 680 | | | | 22.5 | 38.0 | | | | 6.87 | 5.78 |
| 115 | | | | | 730 | | | | | 35.6 | | | | | 5.87 |
| 120 | | | | | 782 | | | | | 33.2 | | | | | 6.00 |

Erdoel and Teer, 9, 170, 1933). The procedure for the sulfuric acid treatment is as follows:

One hundred milliliters of the fraction are mixed with three volumes of 98 per cent sulfuric acid and shaken for 30 minutes. After separation in a separatory funnel the fraction may, if necessary, be treated repeatedly with three volumes of sulfuric acid of the same concentration to insure complete removal of aromatics. The treated fraction is neutralized, washed and dried.

If the sample contains unsaturates (cracked, etc., distillates) the method becomes very complicated, involving determining the amount of combined unsaturates and aromatics, the decrease in aniline point by removal of aromatics and unsaturates, and the aniline coefficients for the aromatics and for the unsaturates.

# Asphaltic Pipe Coatings

*(Continued from page 73)*

whereas the remaining half is under irrigation approximately 10 months of the year.

About 2 years after the line had been laid, cathodic protection was applied to the pipe line for experimental purposes—which may account for the small increase of coating conductance with time. The current required was estimated at about 15 ma., but actually a single galvanic anode delivered about 40 ma.

Cases C and D: These two cases are similar in many respects in that each pipe line lies largely in excessively corrosive soil and each is fed by a number of laterals insulated from the main line. Test of these lines led to the discovery and repair of defective insulating flanges in each line.

To test the lines, which are set apart from other structures at their terminals and at many laterals with insulating flanges, current was introduced across one flange, and the potential of the pipe was measured at a number of the laterals and at the terminal flange. Inasmuch as much current can enter an exceedingly well-coated pipe line only through a defective flange or other grounded structure, the test is, in effect, a measurement of the pipe resistance. This is readily seen to be true because the current, which enters the pipe at a point, and is thus constant, is not appreciably augmented by current which enters through the coating.

In Fig. 2 the measured potentials along the pipe line are plotted as ordinates against the stationing as abscissae. The dots are the experimental values for case "C," whereas the circles are for case "D."

Referring to case "C" in the figure, at about 54,000 ft. there is a change in the weight of the pipe, which change is reflected in an alteration in the slope of the curve—the steeper slope corresponding to the lighter pipe of higher electrical resistance. The break in the curve at about 13,000 ft. is the point where substantial current enters the pipe line. Accordingly, it is deduced that the flange—which insulates the lateral there—is defective. The potential across the insulating flange at the origin reflects the potential of the pipe at the defective flange, and thus the 13,000 ft. of the asphalt-mastic-coated line serves merely as an exceedingly long insulated test lead.

After a faulty insulating flange had been repaired on a lease line at the indicated point, the potential across the flange at the origin did not differ much from the potential applied at the other end of the line, as shown by the dotted curve between the extremities of the pipe line. The coating conductance, given in the table, was then calculated from these potential measurements.

In case "D" the insulating flange at the end of the pipe line at approximately 150,000 ft. was found to be shorted. The dotted curve is the potential-gradient curve after repair of the defective flange. The calculated conductance is shown in the table.

Case E: This is the same pipe line reported as case 8 in Table 1. The conductance of 0.38 micromhos per square foot was measured before the discontinuity survey. The recent measurement shows a marked decrease in conductance, which is attributed to the repair of the discontinuity.

**TABLE 3—EFFECTIVE RESISTANCE OF A FIELD-APPLIED WRAPPED ASPHALT COATING**

| Distance from point of drainage (ft.) | Soil resistivity (ohm centimeters) | Effective resistance (ohms) |
|---|---|---|
| 4 | 1,920 | *0.538 |
| 1,900 | 980 | 0.443 |
| 4,000 | 860 | 0.420 |
| 7,920 | 1,050 | 0.434 |
| 13,100 | 2,320 | 0.458 |
| 18,380 | 2,400 | 0.457 |
| 23,791 | 1,860 | 0.425 |
| 29,040 | 1,680 | 0.467 |
| 39,501 | 1,580 | 0.455 |
| 53,240 | 2,150 | 0.482 |
| | | Average 0.449 |

*Omitted from the average because the point of potential test lies in the anode field and the voltage reading is unreliable

**TABLE 2—CONDUCTANCE OF SOME PIPE COATINGS***

| Case | Pipe size (in.) | Date of test | Age (years) | Length (miles) | Resistance (ohms) | Conductance (micromhos per sq. ft.) |
|---|---|---|---|---|---|---|
| A | 8⅝ | 7/47 | 7.0 | 10.0 | 0.386 | 19.1 |
| B | 6⅝ | 3/46 | 1.9 | 9.67 | 6.67 | 1.68 |
| | | 7/49 | 5.3 | | 1.42 | 4.02 |
| C | 8⅝ | 9/49 | 0.25 | 24.60 | 3.44 | 0.71 |
| D | 10¾ | 9/49 | 1.25 | 21.90 | 17.7 | 0.27 |
| E | 6⅝ | 8/49 | 0.60 | 4.24 | 66.9 | 0.38 |
| | | | 1.80 | | 124.4 | 0.21 |

*"A" is an asbestos felt-wrapped asphalt coating; "B" through "E" are asphalt-mastic coatings

### Discussion

Frequency of discontinuities on asphalt-mastic coatings is usually so low that between 5 and 15 miles of right-of-way can be traversed in a day. The cost of the survey is, therefore, very small. The conductance of any section of more or less uniformly well-coated pipe can always be tested by the outlined methods. Such measurements are negligible in cost, and are reduced to extreme simplicity if care is taken to isolate the pipe line with insulating flanges at suitable locations, such as at pump stations and at laterals, and to avoid all possible sources of current leakage. Such isolation of the pipe line is good practice from the corrosion standpoint, as has been discussed by Huddleston.

The coating described under case 2 of Table 1 indicates lack of plant control, in that the asphalt content of the mastic ranged outside or at least toward the upper specification limit. Such coating-plant "errors" should not occur, because quality of asphalt-mastic coatings is maintained by:

1. Continual raw-material analysis of the ingredients to insure conformance to the specifications for the size of pipe to be coated and the type of service for which the line is intended.
2. Plant calibration made at intervals to maintain the correct metering and mixing of all the materials.
3. Complete check of the asphalt mastic by means of a spark-type holiday detector and repair of imperfections, if any, before hauling or stockpiling.

### Acknowledgment

The data presented to illustrate the arguments were obtained by the author on pipe lines of many different owners. The author is grateful for use of this information.

### References

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# Model M-318 Tractor Winches

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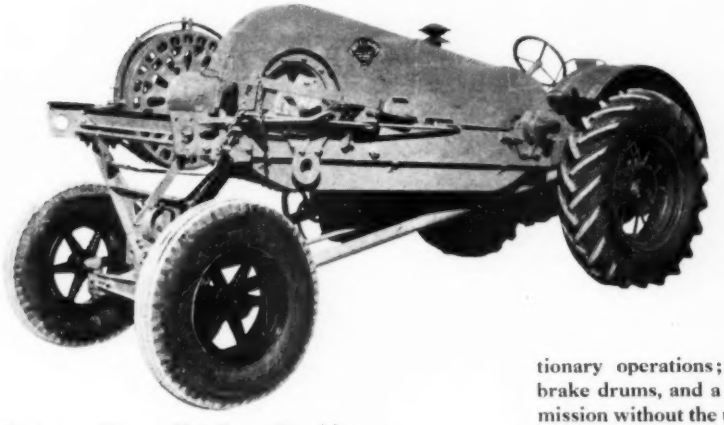

Brakes — Two — 32" dia. x 6" wide
Drum Capacity — 4800' of $\frac{5}{8}$" line
Line Speeds — 8 from 38' to 1030' p.m.
Maximum Line Pull — 30,300 lbs. @ 38' p.m.
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The Model M-318 Tractor is compactly designed and balanced for high speeds on the road and at the well. Will go over ground conditions that are impassable or extremely difficult for other types of pulling equipment.

Powered by an Allis-Chalmers heavy duty, valve-in-head, removable sleeve type engine with ample cooling capacity for continuous stationary operations; incorporating large capacity brake drums, and a heavy duty tractor type transmission without the use of auxiliary power-take-off, make this unit exceptionally safe and efficient.

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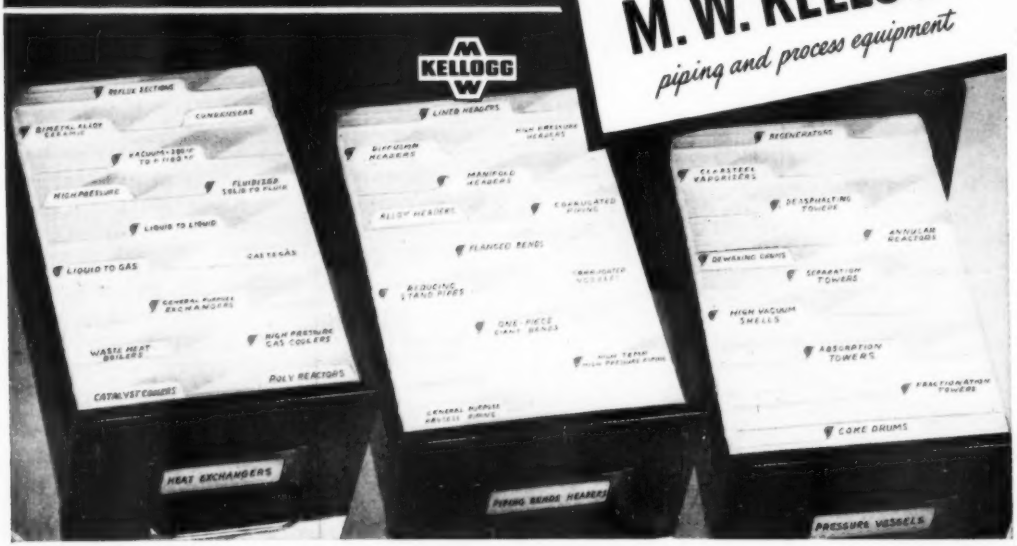


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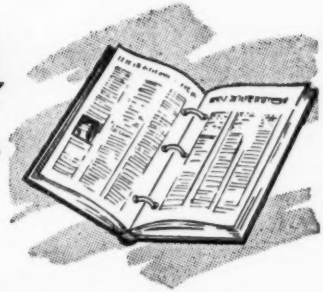
# The Refiner's Notebook

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL



# Calculation of Total Loss

IN computing the total loss incurred in refinery processing, the problem encountered is that of making a yield balance which will accurately cover all the present-day manufacturing operations. Under certain conditions use of weight balances automatically provides the solution. However, this is often found to be impractical due to the large number of additional laboratory inspections and calculations which such a procedure requires.

The monthly yield statement, as ordinarily reported on a volume basis, can be used to calculate loss for a straightrun operation but does not give the true loss when applied to such processes as cracking or polymerization. For this reason a compromise may be made between the weight-balance method and use of the volumetric monthly yield statement by correcting the latter for density and state changes taking place in the more complex operations.

One way of doing this, as reported by Esso Standard Oil Co., is the development of empirical yield correlations involving the major processing variables for a given operation. Through these correlations the necessary corrections may be made to the yield as computed on a volume-plus-weight basis. Gas yields ($C_3$ and lighter) and solid products such as coke, wax, and petrolatum, are calculated by weight. Yields of liquid products ($C_4$ and heavier) are reported on a volume basis. Finer adjustments, as for contraction and expansion, are neglected. In developing the empirical correlation-method checks made against weight balances showed good agreement.

To illustrate the use of such correlations as related to the true total loss, a simplified refinery operation is considered in which distillation of crude into gasoline, heavy naphtha, kerosine, and reduced crude bottoms is followed by the thermal conversion of the heavy naphtha and topped crude. Charges per standard operating day and other conditions are:

| | |
|---|---|
| Crude charge to atmospheric tower, bbl. | 30,000 |
| Heavy naphtha (feed to reforming), bbl. | 3,632 |
| Mid-boiling point, naphtha feed, °F. | 350 |
| Reform naphtha yield, volume per cent | 80 |
| Reduced crude (fresh feed to cracking), bbl. | 15,670 |
| Gravity, reduced crude feed, °A.P.I. | 15.0 |
| Viscosity, reduced crude feed, Furol at 122° F | 200 |
| Gasoline yield (reduced crude cracking), per cent | 20 |

Assume that the yield statement for the over-all operation shows a product recovery of 98.34 per cent by volume and 0.85 per cent by weight (gas and solids), or a total recovery, weight + volume, of 99.19 per cent. If no corrections are made for changes taking place in the thermal conversions, the expected recovery, assuming no losses, would be 100 per cent. Total loss would be the difference between this and the total recovery of 99.19 per cent or 0.91 per cent, equivalent to 273 bbl. daily. Actually this is an "apparent" loss as shown by the uncorrected yield statement.

The real loss may be estimated through the correlations reproduced here. For naphtha reforming (Fig. 1) the predicted recovery, volume + weight, is 100.75 per cent. The predicted recovery for reduced crude cracking (Fig. 2) is 104.3 per cent. The expected total recovery then becomes:

$$100 + \left[\left(\frac{3,632}{30,000}\right)(100.75 - 100)\right] + \left[\left(\frac{15,670}{30,000}\right)(104.3 - 100)\right] = 102.35 \text{ per cent}$$

Real total loss = 102.35 — 99.19 = 3.16 per cent, equivalent to 975 bbl. daily.

Corrections may be made similarly for catalytic cracking, naphtha treating, gasoline blending, asphalt blowing, and other operations *(The Oil and Gas Journal, July 28, 1949)*.

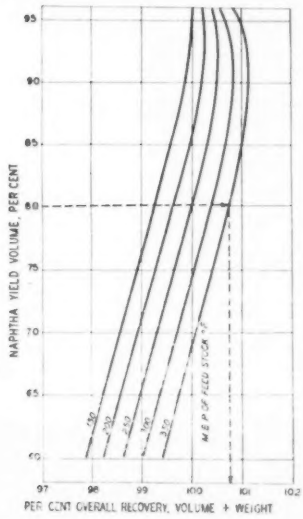



*Fig. 1—(Left) Correlation for estimating recovery in reforming naphtha, based on reformed naphtha yield and mid-boiling point of feed*

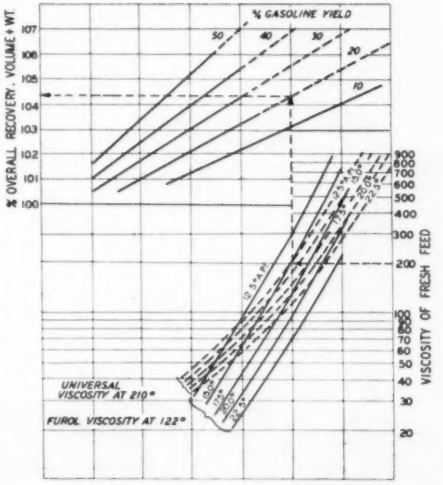



*Fig. 2—(Right) Expected recovery, volume plus weight, in cracking reduced crude*

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ENGINEERING fundamentals

# Pressure Parting of Formations

IN the previous article of this series the discussion centered on the fissure patterns created around wells by explosives, acid treatments, or pressure parting. The last of these is a process not fully understood, but observed in a sufficient number of different well operations to warrant discussion. The process of fracturing a formation hydraulically involves the injection of a fluid at a sufficient rate to permit the pressure to build up to a breakdown pressure at which point fractures form in the formation as evidenced by an increase in flow rate and a decline in injection pressure.

Pressure parting of formations was first discussed in detail relative to its observance in water injection wells.[1] It has been discussed relative to squeeze cementing of wells[2] and has been recognized as a contributing factor in the process of acidizing a well. It has recently been proposed as a special well completion process.[3]

The behavior of water-injection wells indicates a mechanism most readily described by the terminology "overburden lifting." The characteristics which led to this descriptive term are: (1) above the breakdown pressure a well will take an increased amount of water as though new flow channels had been opened (a measurement of this is shown in Fig. 1), (2) by gradually increasing the injection pressure an operator can exceed the breakdown pressure by a definite amount without increasing the flow above that normally expected, (3) when pressures are reduced below the breakdown value the injection rate falls to a normal value, and (4) the point of pressure breakdown can be duplicated by successive tests.

These observations indicate a mechanism not unlike that of a safety control valve. Inasmuch as wells can be brought back to normal injection rates after a breakdown pressure is exceeded, it is concluded that at the breakdown pressure some particular joint within the formation, possibly that at a shale-sand contact, is unloaded. Correlation between excessive injection rates and excessive water-production rates from nearby wells also leads to the general belief that fractures have been formed.

In cementing experiments it is reported that colored cement used in second and third squeeze jobs was seen to follow the same channel as cement from the first job. However, the observed breakdown in cement experiments was within the body of a sand section and not at a shale-sand contact. Once a fissure is formed within a sand body it is difficult to visualize its closing and a second measurement of the same breakdown pressure being taken.

The pressure which is required to break down a formation cannot be stated in an analytic fashion without a mechanism to use as a basis for calculation. When "overburden lifting" was proposed as an explanation, it was estimated that the pressure should be approximately 1 lb. per psi. per foot of depth, a figure arrived at by considering the average density of rocks to be 2.3 times that of water. Record of a sufficient number of breakdown tests is available to show that this is of the order of magnitude, but individual breakdown pressures are extremely variable even within a given local area or formation. Breakdown pressures from 0.5 to 1.7 times the depth of the formation have been reported in the literature.

Although many variables enter into determining the breakdown pressure, a general decrease of required pressure per foot of depth is evidenced with depth. Fig. 2 shows data replotted from several references[1,2,4,5] along with data from several private sources. Breakdown pressures in Reference 5 were assumed as surface pressures.


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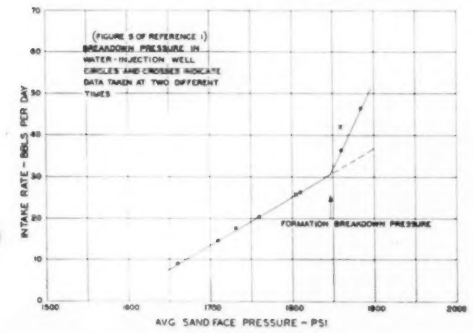



*Fig. 1*

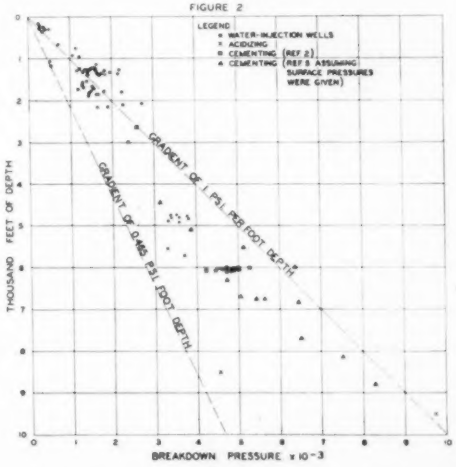
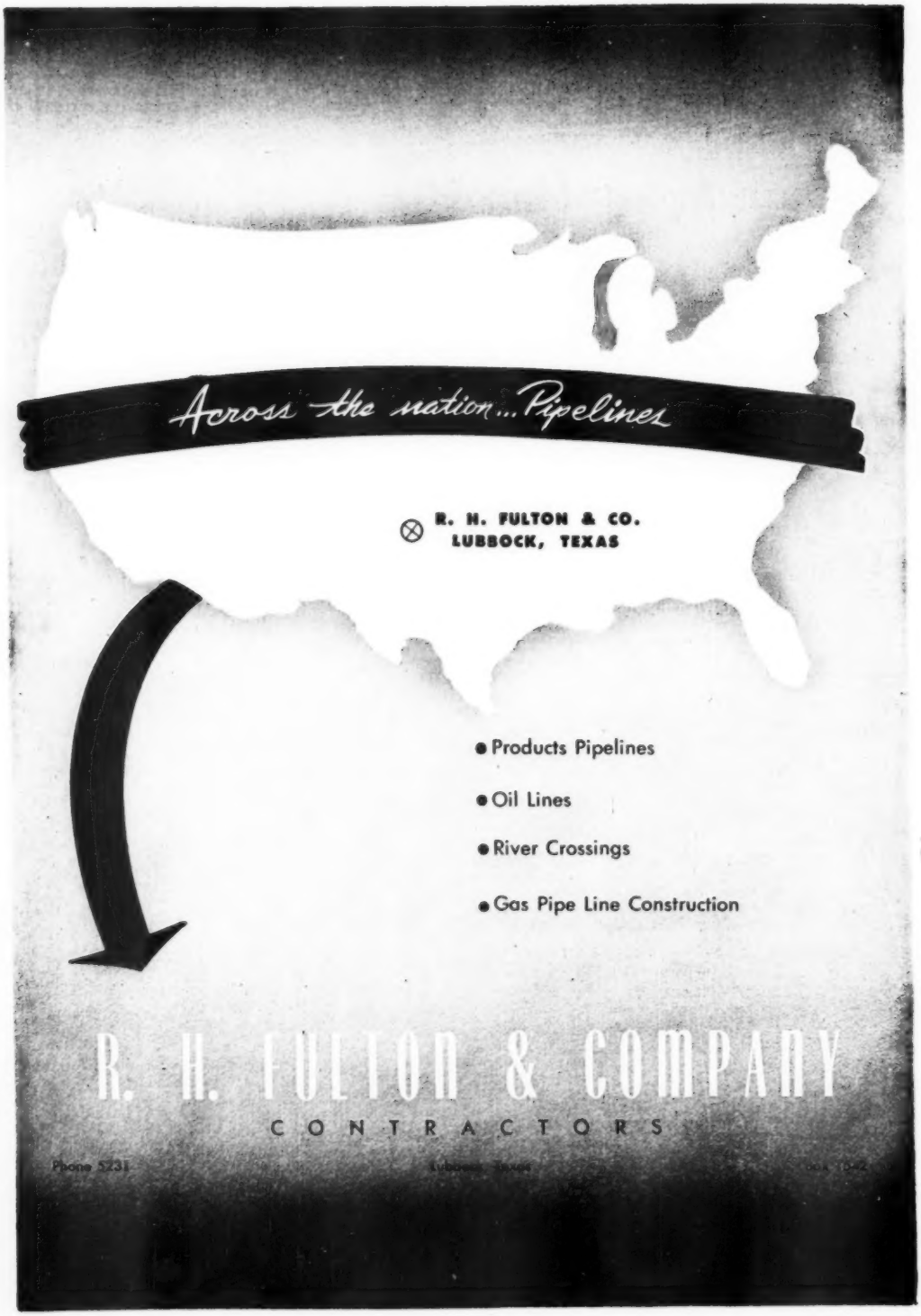



*Fig. 2*

**Series by Dr. John C. Calhoun, Jr., Chairman, Petroleum Engineering School, University of Oklahoma**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# PIPE LINES

## Texas-Empire Contracts For 42-Mile, 16-In. Line

Texas-Empire Pipe Line Co. has awarded contract to O. E. Burden Construction Co. for a 42-mile, 16-in. crude-oil line from Wilmington, Ill., to the Chicago refining area.

This line will increase facilities planned for handling increased shipments following completion of the Basin-Ozark Systems and the Texas Pipe Line Co. Wood River-Patoka, Ill., link. These together with the Texas-Empire 183-mile, 18-in. Patoka-Wilmington, Ill., line were completed in 1949.

## Spreads Organized for Okla.-Kansas City Line

Five spreads are now being organized for the construction of the 290-mile, 12-in. project which Great Lakes Pipe Line Co. has scheduled for completion March 1.

A. C. Holder Construction Co., contractor for the 54-mile, Ponca City-Barnsdall section, expects to operate with one spread starting from the Ponca City end. Fences are being cut and pipe stringing is to be under way by the end of this week. The job also includes a twin 12-in. crossing of the Arkansas River with a total of 6,600 ft.

Pacific Pipe Line & Engineers, Ltd., contractor for the 236-mile, Tulsa-Barnsdall-Kansas City section, is organizing four spreads. Operations for Pacific are being directed by James Howe, superintendent, with headquarters at Chanute, Kans.

The southern main-line spread for laying north from the Arkansas River, near Tulsa, will be based at a warehouse at Skiatook, Okla. This is supervised by Ham Hamilton. The Arkansas River spread will be under Bill Cook, as result of recent change. The Paola, Kans., spread is under Larry Webb, and the Dewey, Okla., spread is under Loue Robertson. In addition to warehouses at the spread headquarters, warehouses are also being established at Caney and Olathe, Kans.

## Signal Pipe Line Corp. Is Merged With Macco Corp.

Signal Pipe Line Corp., Long Beach, Calif., a wholly owned subsidiary of the Macco Corp., has been merged with the parent company, according to John MacLeod, president of Macco, and will operate as the pipe-line division. B. M. Laulhere, Jr., will continue in his previous capacity as manager, MacLeod said.

Purpose of the merger is to extend the company's pipe-line services be-

*Floating equipment employed in the laying of two 20-in. crude-oil lines for Mid-Valley Pipe Line Co. across the Mississippi River. The large crane barge carries mobile X-ray unit for welding inspection. Part of the concrete-encased, Somastic-coated pipe, fabricated in 120-ft. sections, is seen in the right foreground where it lies on the side of the ramp barge.*


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yond its present scope, MacLeod said. It is felt that this can be accomplished much more effectively by performing the utility, natural gas, and oil pipe-line construction work as a division of Macco Corp., he reported.

When Signal Pipe Line Construction Co. was purchased by Signal Pipe Line Corp. last February, the present merger was being given serious consideration, he said, and the interim operation has indicated the practicability of the merger.

Operations are continuing from offices at Signal Hill, El Monte, Colton, and Palm Village, Calif.

## Humble Enlarging Harbor Island Loading Terminal

Humble Pipe Line Co. has under way an extensive rebuilding program at its Harbor Island terminal on the Corpus Christi, Tex., ship channel, which will enable two of the largest tankers to dock and load with crude oil at the same time.

Both of the terminal's present wooden wharves will be torn down and replaced with larger steel wharves, and other work will include dredging of the berthing area to a greater depth and width. A new barge ship will be constructed, along with laying of larger pipe lines to docks, and addition of another 55,000-bbl. ballast tank. Pumping equipment has a present capacity of 45,000 bbl. per hour on all docks.

## Wyoming Fields Get Pipe-Line Outlets

A joint application has been made by Mule Creek Oil Co., Farmers Union Central Exchange, Inc., and Shannon Oil Corp. for a 5-mile, 4-in. crude-oil line from the Murphy Dome field, Hot Springs County, Wyoming, to a connection with Stanolind Pipe Line Co.'s system at the Kirby pump station.

Socony-Vacuum Oil Co., Inc., recently finished a 14-mile, 4-in. line to serve the Gooseberry-Grass Creek producing areas of Wyoming.

## Aluminum Pipe for Line

Lavaca Pipe Line Co. will start construction on January 30 for the laying of 3,500 ft. of 4-in. extruded aluminum pipe to serve the gathering system for transmitting natural gas from offshore wells in Matagorda Bay to the Aluminum Co. of America plant at Fort Comfort, Tex., near Port Lavaca.

**Additional pipe-line news will be found at the end of the pipe-line construction tables on page 95 of this issue.**

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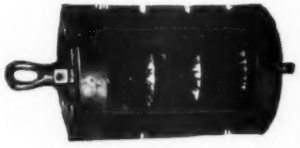

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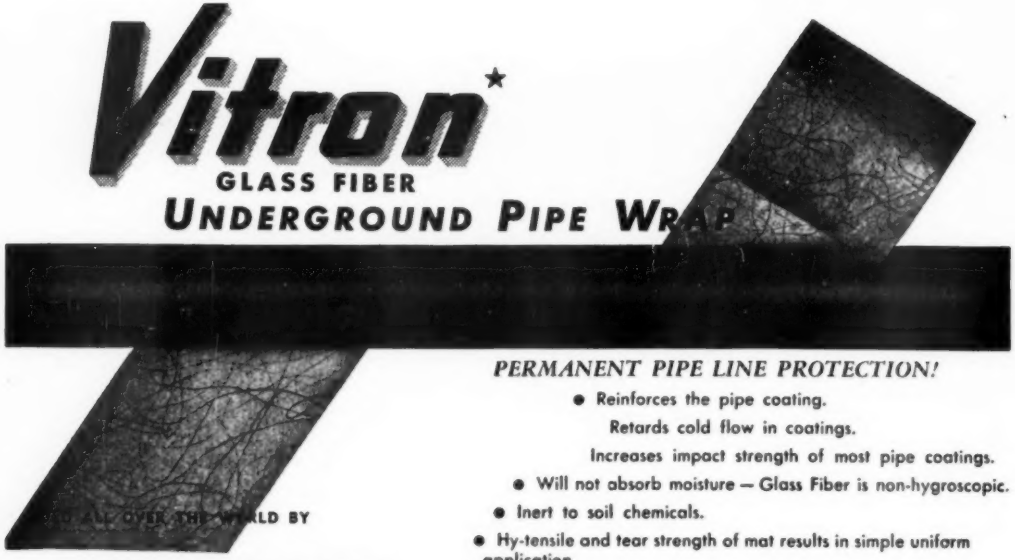

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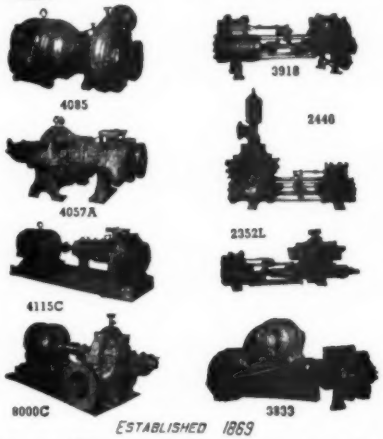


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# Pipe-Line Construction

FOLLOWING is a tabulation of pipe-line projects, both domestic and foreign, which are planned or under construction. Included are crude-oil, products, and natural-gas lines. The list was compiled from surveys made by The Oil and Gas Journal.

### Crude-Oil Pipe Lines—Domestic

**Humble Pipe Line Co.**—371 miles, 18-in., under way, West Texas-Satsuma Station to Baytown, Tex.; 178-mile western section contracted to Morrison Construction Co.; 193-mile eastern section contracted by Anderson Brothers Corp.

**Mid-Valley Pipe Line Co. (Sun and Sohio)**—1,000 miles, 20-22-in., under way, Longview, Tex., to Mayersville, Miss.-Covington, Ky., to Lima, Ohio. Contracts let for 857 miles as follows: Section 2, Haynesville, La., to Mayersville, Miss., Latex Construction Co.; spread office, Farmerville, La.; F. A. Silar, general superintendent; W. A. Briley, spread superintendent; office at Haynesville, La., W. H. Hayes, superintendent; M. L. Thompson, assistant superintendent. 41 miles, 12-in., lateral, Delhi to Lake Providence, La.; headquarters, Lake Providence; E. C. Norris, general superintendent; R. E. Thornton, superintendent. Section 3-A, Mayersville to Oakland, Miss., Associated Pipe Line Contractors, Inc.; J. A. Williams and L. H. Gray, spreadmen; Section 3-B, 4-A, Oakland, Miss., to Henderson, Tenn., Eastern Construction Co.; Section 4-B, 5-A, Henderson to Clarksville, Tenn., Eastern Construction Co.; Section 5-B, 6-A, Clarksville, Tenn., to Elizabethtown, Ky., field office, Clarksville, Tenn., Fred L. Byers, superintendent; Britton Construction Co.; Section 6-B, 111 miles of 22-in., Elizabethtown to Hebron, Ky., H. L. Gentry Construction Co., Frank Morris and Jim Mitchell, spreadmen; Section 7 South, Hebron, Ky., to Eaton, Ohio, Britton Construction Co., field office, Hamilton, Ohio; spreadman, Fred Peters; Section 7 North, Eaton to Lima, Ohio; Section 8, Magnolia, Ark., to Haynesville, La.

Cumberland and Tennessee rivers, Eastern Construction Co.; field office, Clarksville, Tenn., Fred L. Byers, spreadman.

**Portland Pipe Line Co., Montreal Pipe Line Co., Ltd.**—236 miles, 18-in., planned, Portland, Me., to Montreal, Que., Canada, contracted as follows: Oklahoma Contracting Co., 85 miles in Section 1 at southern end; Portland, Me., to Gorham, N. H. Associated Pipeline Contractors, Inc., Section 2; 81 miles; and Fred Mannix Co., Ltd., 68 miles, Section 3, in Canada.

**Richfield Oil Corp.**—40 miles, 10-in., Cuyama Valley-Newhall, Calif., planned; Bechtel Corp., contractor; central plant, Watson, Calif., 60 miles, 14-in., applying field joints, Newhall-Wilmington, Calif.; under way; Bechtel Corp., contractor.

**Shell Pipe Line Corp.**—190 miles, 10¾-in., take up, Cushing, Okla., to Emmitt, Mo.; under way; Trojan Construction Co., Inc., contractor; spread office at Mount Vernon, Mo.; Maufice W. Crawford, spreadman.

160 miles, 10¾-in., Cushing, Okla., to Elk City, Okla.; under construction; Trojan Construction Co., Inc., contractor; field office, El Reno, Okla.; Swede Tillotson, spreadman; Tulsa Pipe Coating Co., coating contractor.

**Texas-Empire Pipe Line Co.**—40 miles, 16-in., authorized, Wilmington, Ill., to East Chicago, Ind.

**Texas-New Mexico Pipe Line Co.**—61 miles, 10-in., authorized, Colorado City to Borden County, Texas. Contracted as follows: 40 miles, 10¾-in., Borden County to Colorado City pump station, Scurry County, Carl H. Dunn; 16.08 miles, 6⅝-in., and 5.41 miles, 4½-in., Borden and Howard counties, Texas; Wright Construction Co., contractor.

### Products Pipe Lines—Domestic

**Buckeye Pipe Line Co.**—Lima, Ohio, to Speedway, Ind., 140 miles, 8-in., nearing completion by H. L. Gentry Construction Co.; field office, Noblesville, Ind.; Frank Morris and Jim Mitchell, spreadmen.

**Great Lakes Pipe Line Co.**—261 miles, 12-in., under way; contracted as follows: 52 miles, 15-in., Albert Lea to Fairbault, Minn.; under construction; Sheehan Pipe Line Construction Co., contractor; field office, Albert Lea, Minn.; C. W. Henderson, spreadman. O. R. Burden Construction Co., 64 miles north from Des Moines; field office, Nevada, Iowa; G. D. Lewis, spreadman; A. C. Holder Construction Co., 72 miles to Iowa-Minnesota state line; Williams Brothers Corp., 20 miles, Mississippi River crossing and line to terminal and station. Kansas and Missouri river crossings, R. H. Fulton & Co.; field office, Kansas City; Ed Veach, spreadman.

290 miles, 12-in., Tulsa to Kansas City, Mo. Contracted as follows, for completion March 1: 54 miles, Ponca City to Barnsdall, Okla., O. R. Borden Construction Co.; and 236 miles, Barnsdall, Okla.-Kansas City, Mo., Pacific Pipe Line & Engineers, Ltd. James Howe, superintendent for Pacific Pipe Line portion is headquartered at Chanute, Kans.; spread office at Tulsa with Ham Hamilton general spreadman and James Williams, river-crossing spreadman; spread office at Dewey, Okla, Loue Robertson, spreadman; and spread office at Paola, Kans., Larry Webb, spreadman.

355 miles, 12-in., authorized, Kansas City through Omaha and Sioux City, Iowa, to Sioux Falls, S. D.

189 miles, 12-in., authorized, Kansas City to Des Moines.

50 miles, 8-in., authorized, Cushing-Drumright-Tulsa, Okla.

**Salt Lake Pipe Line Co.**—242 miles, 6-8-in., Boise, Idaho-Pasco, Wash., planned.

### Natural-Gas Pipe Lines—Domestic

**Alabama-Tennessee Natural Gas Co.**—Planned, Muscle Shoals-Decatur, Ala., 36 miles, 8-in., and Decatur-Huntsville, Ala., 27 miles, 6-in.

**Arkansas Louisiana Gas Co.**—162 miles, 20-in., under construction, Waskom, Tex., and Perla, Ark.

70 miles, 20-in., under construction, Waskom, Tex., to Magnolia, Ark.; Anderson Brothers, contractor; field office, Greenwood, La.; J. D. Brown, spreadman; field office, Plain Dealing, La.; Truman Anderson, spreadman.

**Atlantic Gulf Gas Co. (United Gas Pipe Line Co.)**—1,530 miles, planned, Alabama-Florida-Georgia-South Carolina.

**Central Hudson Gas & Electric Corp.**—40 miles, authorized, Tuxedo, N. Y., station, Home Gas Co. line now under construction, to Poughkeepsie, N. Y.

**Central Kentucky Natural Gas Co.**—36 miles, 12-20-in., planned, Kentucky loops.

**Chicago District Pipe Line Co.**—41 miles, 24-in., planned, Joliet, Ill., to Chicago.

**City of Indianapolis, Ind., Inc.**—55 miles 16-in., proposed, Indianapolis to Texas Eastern Transmission Corp.'s system.

**Cities Service Gas Co.**—47 miles, 3-4-16-in. planned, in Kansas.

**Coastal Pipe Line Co.**—1,000 miles, planned, Texas to Norfolk, Va.

**Colorado Interstate Gas Co.**—38 miles, 20-in., planned, Texas Panhandle and Hugoton field, Kansas, to Denver, looping. Cheek Construction Co., contractor; Troy Cheek, superintendent.

**Colorado-Wyoming Gas Co.**—41 miles, planned, Greeley, LaSalle, and Windsor, Colo., areas.

**Commonwealth Natural Gas Corp.**—537


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"Tailor Made" for
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ALL PIGS ARE PROVIDED WITH THE EXCLUSIVE "JET ROTATION" FEATURE*

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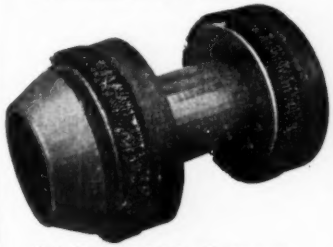
Each Pig Is Designed To Traverse Specified Valves and Fittings — SAFELY

FOR EXAMPLE:

This Type RC-1 Pig, 16" size and larger, is for the usual conditions of:
Conventional gate valves
Full diameter, 90° laterals
Field bends, min. radius 10 ft.



This 22" Type RC-5 will traverse
Through-conduit valves
Full diameter, 90° laterals
Factory ells, 1½ radius, 22½°

Type RC-1 Pigs, 14" size and smaller, must traverse
Various types of gate valves
Elongated side openings (laterals)
Small-angle sharp bends

*Patents pending

T. D. Williamson, Inc.
TULSA 9, OKLAHOMA

miles, 20-in., planned, West Bend, Ky., to Norfolk, Va.

200 miles, planned, Green County, Virginia, to Norfolk.

**Egyptian Natural Gas Co.**—80 miles, 6-8-in., planned, Norris City to Salem-Centralia, Ill., areas.

**East Tennessee Natural Gas Co.**—398 miles, 3-16-in., planned, Nashville-Chattanooga-Knoxville, Tenn., and lateral lines.

172 miles, 22-in., under construction, Greenbrier, Tenn., to Oak Ridge; Oman-Fulton & Brodie, contractor. Office, spread 1, Cookeville, Tenn.; H. P. Crawford, spreadman. Spread 2 office, Crossville, Tenn.; A. A. Carrigan, spreadman. Spread 3 office, Harriman, Tenn.; M. L. Boyd, spreadman; J. T. Brodie, general superintendent.

185 miles, 16-in., Lobelville-Chattanooga, Tenn., contracted by Walters & Saigh Construction Co., for construction in 1950; 120 miles, 12-in., Chatanooga-Knoxville, Tenn.; contracted by Walter and Saigh Construction Co., for construction in 1950; 100 miles of laterals to be laid in 1950. Construction 150 miles, 16-in., Knoxville-Bristol, Tenn., under consideration.

**El Paso Natural Gas Co.**—All work done by company crews.

Looping of 26-in., New Mexico-California line and connection with Pacific Gas & Electric Co. at Needles, Calif. 352 miles, 30-in., completion November 1950.

450 miles, 30-in., under construction, Eunice, N. M.-Blythe, Calif., looping; completion March 1950.

450 miles, 24-in., planned, San Juan basin, New Mexico to Franconia, Ariz.

**Home Gas Co.**—70 miles, planned, Orange, Sullivan-Rockland counties, New York-Cattaraugus County, New York, areas.

**Jersey Central Power & Light Co.**—39.4 miles, 10-in., planned, New Jersey to Coast system, Texas Eastern Transmission Co.'s Big Inch.

**Michigan-Wisconsin Gas Co.**—185 miles, 4-14-in. laterals, Milwaukee-Fond du Lac, Sheboygan, and Green Bay, Wis., under construction; C. C. Griffis Construction Co., contractor; Paul Means, superintendent for Lake Del Mort crossing.

**Montana-Dakota Utilities Co. and Montana-Wyoming Gas Pipe Line Co.**—340 miles, 12¾-in., planned, Worland, Wyo., to Cabin Creek, Mont.

**Montana Power Co.**—83 miles, 12¾-in., planned, Butte to Bozeman, Mont.

**Northeastern Gas Transmission Co.**—511 miles, up to 20-in., planned, in New England area.

**Northern Natural Gas Co.**—41 miles, 20-in., under construction, Southwest from Garden City, Kans.; R. H. Fulton & Co., contractor.

597 miles of looping in 10 sections, contracted as follows: R. H. Fulton & Co., loops 1 to 5: loop 1, 40.2 miles, 26-in., extending northward from a point 28.7 miles north of Skellytown station in Pampa, Tex., area; loop 2, Beaver, Okla., station, 74.9 miles, 26-in.; loop 3, Mullinville, Kans., station, 33¼ miles, 26-in.; loop 4, Bushton, Kans., station, 72½ miles, 26-in.; loop 5, from a point west fo Garden City, Kans., to Bushton, Kans., station, 155 miles, 20-in. Midwestern Constructors, Inc., loops 6 and 7; loop 6, from a point 29 miles northeast of Palmyra, Nebr., station, 43.4 miles, 26-in., to Oakland, Iowa, station; loop 7, from a point 17.8 miles northeast of Oakland, Iowa, station, 65.9 miles, 26-in. R. B. Potashnick, loops 8 to 10: loop 8, southwestward from Ventura, Iowa, station, 31.2 miles, 26-in.; loop 9, northward from Ventura station, 41 miles, 26-in.; loop 10, from the north end of a 26-mile gap beyond loop 9, where another loop will be built consisting of 39½ miles, 26-in.

**Northwest Natural Gas Co.**—750 miles, planned; Washington, Oregon, and Idaho.

**Pacific Gas & Electric Co.**—506 miles, 34-in., under construction, Topock, Ariz.-Milpitas Calif.; Bechtel-Price-Conyes, contractor; spread office, Coyote, Calif.; R. L. Bowman, general superintendent.

**Panhandle Eastern Pipe Line Co.**—356 miles, 26-in., authorized, looping in Texas, Oklahoma, Kansas, Missouri, Illinois, Indiana, Ohio, and Michigan.

**Peoples Gas Light & Coke Co.**—Planned 42 miles, 24-in., Joliet-Chicago, Ill.

**Phillips Petroleum Co.**—25 miles gathering system in West Edmond, Okla., field, under construction; Vaughn & Taylor Construction Co., Inc., contractor; spread office Edmond, Okla.

**Piedmont Natural Gas Corp.**—1,350 miles, 20-in., planned, Greenville, Miss., to Norfolk, Va.

**Plains Natural Gas Co.**—78 miles, gathering system, Oklahoma-Kansas area, Hugoton field. Contracted by: Arey-Phillips Construction Co., Amarillo, Tex.; Tulsa Pipe Coating Co., and Mid-Western Constructors, Inc. Latter firm represented by Lyle DeWitt.

**South Jersey Gas Co.**—77 miles, planned, Camden to Atlantic City.

**Southern Natural Gas Co.**—138 miles, 20-22-in., planned, Chattanooga, Tenn., to Lexington, Miss.

375 miles, 24-in., planned, Gwinville, Miss., to Atlanta.

225 miles, 16-in., planned, Colfax, Ga., extension.

110 miles, 11-in., considered; extension.

314 miles, 18-in., planned; extension.

171 miles, 16-in., planned; extension.

118 miles, 13-in., planned; extension.

**Southern Union Gas Co.**—78 miles, 8-10-14-in., planned, New Mexico loops and laterals.

**Tennessee Gas Transmission Co.**—65 miles, 16-in., planned, Ohio-Pittsburgh spur.

790 miles, 20-26-in., planned, Burnaugh, Ky., to Boston, including 400-mile line to Buffalo.

992 miles, 30-in., planned, first 150 miles of loops to be laid at Monroe, La., Greenville, Miss., Midland and Portland, Tenn.

54.2 miles, 30-in., under construction, White Bluff area to Joelton, Tenn., area, contracted to Morrison Construction Co.

36.1 miles, 30-in., under construction, Glasgow, Ky., area to Joelton area, contracted to Morrison Construction Co.

18.1 miles, 30-in., under construction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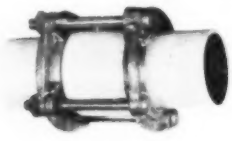
## ...day or night, in a matter of minutes

All you do with a Dresser Clamp is put it around the leaking pipe and tighten a few bolts. It's the quick, simple way to stop leaks in any weather, on any pipe—without shutting down. They're favored by maintenance men everywhere.

68 years of piping experience stand behind these modern clamps. Specify Dresser Grade 29 Gaskets for greater protection.

The four styles shown here are just part of Dresser's complete line of repair products. Your nearest oilfield supply store carries them... and you can get overnight delivery from our Houston warehouse. For complete specifications, write for our Oilfield Catalog. Be ready for fast repairs by keeping Dressers in stock.



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Styles 4 and 41, for repairing and preventing leaks through threads of screw collars.

BAND CLAMP

Style 77B, for repairing small leaks and holes in the run of pipe.

SPLIT REPAIR CLAMP

Style 79B, for repairing pitholes and longitudinal splits in pipe.

POROUS-WELD CLAMP

Style 55, for repairing circumferential weld leaks.

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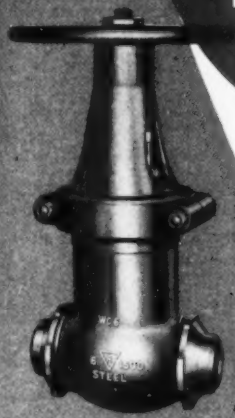

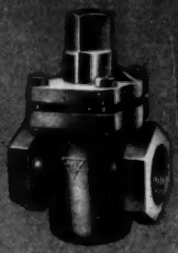

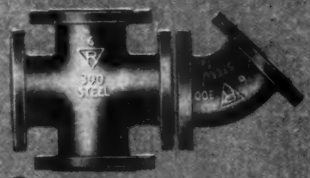

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**"shall be held responsible**
**"for the production of goods**
**"as near perfect in design,**
**"material and workmanship**
**"as shall make them merchantable**
**"and of a character that will serve**
**"to establish for this company**
**"a high reputation."**

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TRADE MARK

Union City to Buckeye, Ky., Anderson Brothers Corp., contractors.

27.7 miles, 13-in., under construction, El Campo, Tex., to near Traitor, Tex.; Massey Construction Co., contractor.

25 miles, 30-in., Hardeman and McNairy counties, Tennessee; H. C. Price Co.; field office, Selmer, Tenn.; J. A. Reutzel, spreadman.

70 miles, 26-30-in., between stations 104 and 110; Anderson Brothers Corp.; field office, Richmond, Ky.; E. C. McCoy and Arkie Hobson, spreadmen.

170 miles of 26 and 30-in., contracted by Anderson Brothers Corp., in Kentucky.

**Texas-Eastern Transmission Corp.**—1,400 miles planned, Texas to Pittsburgh loops.

**Texas Gas Transmission Corp.**—103 miles, 20-in., Carthage, Tex., to near Lisbon, La., (Sharon); under construction; N. A. Saigh Co., Inc., contractor; Carthage, Tex.; Bob Floyd, representative. Construction subcontracted: (1) Fowler Brothers, 43 miles from Carthage to Red River, field office at Carthage; M. C. Johnson, spreadman; (2) 63 miles to Sharon station, Oklahoma Contracting Co. (J. R. Horrigan) field office at Minden, La.; Ed Flanagan, spreadman.

Midwestern Constructors, Inc., 80 miles, 26-in., in Jefferson County, Indiana, and Warren County, Ohio; being completed; R. Carl Stanley, superintendent in charge; field offices, Hamilton and Middletown, Ohio; M. T. Wilhite, spreadman.

32 miles, planned, Slaughters, Ky., to Evansville, Ind.

**Texas Illinois Natural Gas Pipeline Co.**—1,400 miles, 30-in., planned, La Gloria field, Texas, to Joliet, Ill.

58-mile, 20-in. lateral, Joliet terminal to connection with Natural Gas Pipeline Co. of America near Volo, Ill.

**Transcontinental Gas Pipe Line Co.**—Texas-New York 1,840 miles, 30-in., main line and 500 miles, 4 to 22-in., gathering line. Section of 605 miles of 30-in. nearing completion.

Section (unnumbered), Rio Grande Valley to Eunice, La., 502 miles; contracts not let. Section 3, Bassfield, Miss., to Tombigbee River, Alabama, 112 miles; Wunderlich-Griffis Construction Co. Section 5, Coosa River, Alabama, to Newman, Ga., 103 miles; Midwestern Constructors, Inc.; field office, Alexander City, Ala.; M. T. (Bill) Wilhite, superintendent. Section 6, Newman, Ga., to Danielsville, Ga., 108 miles; Williams Brothers Co.; field office, Monroe, Ga.; Thelmer Davis, spreadman. Section 7, Danielsville, Ga., to Saluda River, South Carolina; 86 miles; Williams Brothers Co. Section 8, Saluda River, South Carolina, to Catawba River, North Carolina, 102 miles; R. H. Fulton & Co. Section 9, Catawba River, North Carolina, to North Carolina-Virginia boundary, 100 miles; R. H. Fulton & Co. Section 10, North Carolina-Virginia boundary to James River, Virginia; 86 miles; O. R. Smith Contracting Corp. Section 11, James River, Virginia, to Potomac River, Virginia; 110 miles; O. R. Smith Contracting Corp. Section 12, Potomac River, Virginia, to Susquehanna River, Pennsylvania, 76 miles; Associated Engineers & Contractors, Inc. Section 13, Susquehanna, Pennsylvania, to Delaware River, 90 miles; Wunderlich & Griffis Construction Co. Section 14, Delaware River to Hackensack River, New Jersey, 61 miles; Wunderlich & Griffis Construction Co. Section (unnumbered), Hackensack River, New Jersey, to Hudson River, New York, 23 miles; Oklahoma Contracting Co.; field office, Edgewater, N. J.; M. E. Shiflett, spreadman.

**Trunkline Gas Supply Co.**—1,775 miles, 10-26-in., planned; includes 740-mile, 26-in. main line from Lake Charles, La., to Tuscola compressor station on Panhandle Eastern Pipe Line Co., and 1,035 miles, 10-24-in. Lake Charles, La., to McAllen, Tex., field lines, pending FPC approval of changed plans.

**United Fuel Gas Co.**—32 miles, 20-in., authorized; Roane, Calhoun, and Wetzel counties, West Virginia.

**United Gas Pipe Line Co.**—90 miles, 16-in., planned, West Bay field to New Orleans.

105.6 miles, 20-in., planned, loop line paralleling Carthage, Tex.-Sterlington, La., and extending on to near Monroe, La.; O. C. Whitaker Co., contractor for 42-mile, 20-in. section, Ruston, La., to Red River; field offices, Ringgold and Bienville, La.; Merle Tatum, spreadman; Rosson-Richards Co., coating contractor.

26 miles in Louisiana conecting with East Texas system, planned.

**United Natural Gas Co.**—29 miles, 12-in., authorized, laterals, Elk County, Pennsylvania.

**Virginia Natural Gas Co.**—153 miles, planned, Buckingham to Richmond and Portsmouth, Va.

## Crude-Oil Pipe Lines—Foreign

**Interprovincial Pipe Line Co. (Imperial)**—1,150 miles, 16-20-in., Edmonton area, to Superior, Wis.; contracted as follows: 480 miles, 20-in., Edmonton-Regina, Canadian-Bechtel, Ltd., associated with Fred Mannix Co., Calgary, Alta.; 340 miles, 16-in., Regina to Gretna, Man., Williams Brothers Corp.; 360 miles, 18-in., Minnesota and Wisconsin, Anderson Brothers Corp.

**Iraq Petroleum Co., Ltd.**—620 miles, 16-in., Kirkuk-Haifa, Palestine, shut down.

556 miles, 30-32-in., planned, Kirkuk, Iraq-Banias, Lakatia.

**Middle East Pipe Line Co.**—800 miles, 34-36-in., planned, Iran-Levantine Port.

**Montreal Pipe Line Co., Ltd.**—(See Portland Pipe Line Co. item in domestic crude oil list.)

**Petroleos Mexicanos**—280 miles, 12¾-in., authorized, Poza Rica to Salamanca, Mexico.

**Santos Jundial Railroad**—30 miles, 18-in., planned, Santos to Sao Paulo, Brazil.

**Trans-Arabian Pipe Line Co.**—1,067 miles, 30-31-in., under construction, Abqaiq, Saudi Arabia, to Sidon, Lebanon; International Bechtel, Inc., Williams Brothers Corp., Graver Tank & Mfg. Co., and Chicago Bridge & Iron Co., contractors.

**Yacimientos Petrolliferos Fiscales de Argentina.**—25 miles, under way, Tupungato-Lujan de Cuyo.

409 miles, under way, Plaza Huincul-Bahia Blanca.

## Products Pipe Lines—Foreign

**Petroleos Mexicanos.**—160 miles, 10¾-in., authorized, Minatitlan to Salina Cruz, Mexico.

**Cia. des Pipe Lines Petroliers Francias.**—150 miles, 10-in., planned, Le Havre to Paris, France.

**Colombian Government.**—268 miles, planned, Puerto Berrio to La Dorada, 90 miles; Puerto Berrio to Medellin, 103 miles; Buena Ventura to Cali, 75 miles.

**Northern Pipe Line, Ltd.**—300 miles, 10-in., planned, Montreal to Toronto, Canada.

**Santos Jundial Railroad.**—40 miles, 10-in., planned, Santos to Sao Paulo to Campinas, Brazil.

## Natural-Gas Pipe Lines—Foreign

**Direccion General del Gas del Estado.**—310 miles, planned, Plaza Huincul to Neu-


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quen, Argentina, to the vicinity of General Conesa, Argentina.

62 miles, Comodoro Rivadavia to Caleto Olivia, under way.

**Northwest Natural Gas Co.**—950 miles, 24-in., planned, Alberta fields to Vancouver, B. C., Seattle, Wash., and Portland, Ore.

**Petroleos Mexicanos.**—205 miles, 16-in., considered, Monterrey to Torreon, Mexico. 260 miles, 20-in., considered, Monterrey-Tampico-Poza Rica area, Mexico.

**Petroleos Mexicanos, Mexican Gas Co., and Industrial Gas Co.**—600 miles, planned, Reynosa, Tamaulipas to Mexico City, D. F., Mexico.

**Westcoast Transmission Co., Ltd.**—1,406 miles, 30-in., planned, North Alberta, Vancouver, B. C., and northern California.

**Western Pipe Lines.**—710 miles, 22-24-in., planned, Alberta fields, Saskatoon, Alta., to Winnipeg, Man., Canada.

## United Authorized to Build 105-Mile Natural-Gas Line

United Gas Pipe Line Co., Shreveport, has been given authorization by Federal Power Commission to construct a 105.6-mile natural-gas line from the Texas border to Monroe, La., at an estimated cost of $5,113,300.

The new gas line will increase the firm's deliveries to Mississippi River Fuel Corp., St. Louis, by approximately 122,000,000 cu. ft. daily *(The Oil and Gas Journal, October 27, page 103)*.

## Refined-Product Traffic in Pipe Lines Shows Gains

The three principal refined petroleum products handled by pipe lines ranged up to 11 per cent higher in volume during the first 10 months of 1949 than in the same period a year ago, according to a recent U. S. Bureau of Mines report.

Products delivered from lines in the 10-month period totaled 282,744,000 bbl., representing an increase of 11.2 per cent, or 28,501,000 bbl. from the same period during 1948. Product deliveries in October totaled 30,320,000 bbl., up 2,593,000 bbl., or 9.3 per cent from the same month a year ago.

Products turned into pipe lines in the first 10 months totaled 284,163,000 bbl., a gain of 26,604,000, or 10.3 per cent from the corresponding period in 1948. Products turned into the lines in October amounted to 29,997,000 bbl., up 2,623,000, or 9.5 per cent from the same month a year ago.

Of the total volume of refined products delivered from lines in the 10-month period, 60 per cent was motor fuel, 13 per cent distillate, and 7 per cent kerosine. A year ago the ratio was 79 per cent motor fuel, 15 per cent distillate, and 6 per cent kerosine.

Total motor fuel delivered from lines in the 10-month period amounted to 231,533,000 bbl., an increase of 29,283,000 bbl., or 14.5 per cent over the same period a year ago; distillate deliveries were 37,659,000 bbl., down 489,000 bbl., or 1.3 per cent; and kerosine deliveries were 13,552,000 bbl.


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Largest Independent and Exclusive Metal Ball Manufacturer

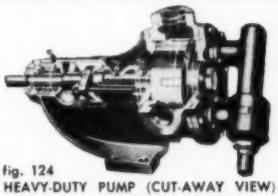
fig. 124
HEAVY-DUTY PUMP (CUT-AWAY VIEW)

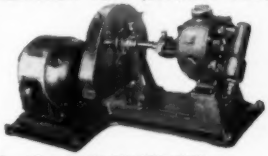
fig. 12 — BACK GEARED UNIT

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## Among the

# Drilling Contractors

### Number of Operating Rigs Declines for Third Week

Another sharp drop in the number of rotary rigs operating in the United States and Western Canada was reported during the week ended January 2 (latest report). This was the third consecutive week in which a decline was recorded, and it placed the total number of active rigs 172 below the high mark of the past year reached during the week ended December 12. Total during the latest reported week was 2,200, a decline of 88 from the number running during the preceding week. It was 38 under the total reported a year ago. The slackening in activity was general in all areas except the West Texas - New Mexico and Arkansas-North Louisiana-East Texas districts. The total still is 122 under the low of 1,900 rigs reported running during the week ended September 26.

**ROTARY RIGS IN OPERATION***
(United States and Western Canada)

| Area | Week ended 1-2-50 | Change week ended 12-26-49 | Change week ended 1-3-49 |
|---|---|---|---|
| Gulf Coast | 496 | —31 | — 52 |
| W. Tex.-N. M. | 708 | — 8 | +152 |
| Ark.-N. La.-E. Tex. | 153 | 0 | — 29 |
| Oklahoma | 243 | —16 | — 13 |
| Kansas | 121 | —13 | — 3 |
| Illinois-Eastern | 108 | —16 | + 5 |
| Rocky Mountains | 79 | — 3 | — 65 |
| Pacific Coast | 126 | —14 | — 43 |
| Total United States | 2,034 | —85 | — 48 |
| Western Canada | 78 | — 3 | + 10 |
| Total | 2,112 | —88 | — 38 |

*Courtesy Hughes Tool Co.

### Big West Incorporated

Incorporation of the Big West Drilling Co., Dallas, formerly operated as a partnership, has been announced by G. H. Vaughn and H. W. Klein, principal owners. The company was incorporated for $50,000, all paid in cash.

**Waggoner - Williams Drilling Co.,** Oklahoma City, is moving a rig to a wildcat location southeast of Agra in Lincoln County, Oklahoma, where it will drill for Gulf Coast Western Oil Co. at 1 Stevens, in 12-16n-4e.

**Austin Stewart Drilling Co.,** Shreveport, has contracted with Skelly Oil Co. for another Pettit well in the East Lisbon field, Claiborne Parish, Louisiana. It will be 1-D Henry, located in 27-21n-4w.

**Milton Crow, Inc.,** has been awarded contract for a projected 7,300-ft. exploratory test to be drilled for

*In addition to its contracting business, Newman Brothers Drilling Co., San Antonio, is developing and operating several good producing properties for its own account. One of these is in the Pierce Junction field, just south of Houston. Its farm boss and toolpusher in this field, together with members of two of its drilling crews, are shown in the accompanying picture. They are, lower row (left to right): C. L. Joyce, farm boss; W. R. Crick, toolpusher; C. W. Perry, driller; L. M. Lightsey, derrickman; R. D. Slayton and D. R. Covington, floormen. Upper row, same order: James Cox, engineer, Eastman Oilwell Survey Co.; F. E. Holbert, driller; H. L. Conn, derrickman; O. D. Holbert and O. A. Caswell, floormen.*


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Greenbrier Oil Co. at 1 Davis, in 5-1s-21w, 2 miles north of Waldo, Columbia County, Arkansas. This contractor also is planning to drill a Smackover lime test for himself near the Three Creeks townsite in Union County, Arkansas. Specific location has not been decided but the test probably will involve drilling at least 8,800 ft.

**Gardner Brothers Drilling Co.,** Healdton, Okla., has been awarded the contract by Gulf Coast Western Oil Co. for a 4,000-ft. Mississippian test to be drilled in the South Ponca chat pool, in Kay County, Oklahoma. Location is in 18-25n-2e.

**Webster Drilling Co.** is the contractor for Nadel & Gussman at 1 Leonard, a 3,800-ft. semiwildcat Wilcox sand test being started in 21-27n-1e, 4 miles east of Blackwell, Kay County, Oklahoma.

**Morrison Drilling Co.,** El Dorado, Kans., has a rig working for Deardorf Oil Corp. at a wildcat location 2 miles southeast of the Carson pool, Cowley County, Kansas. The test, 1 Rockwell, is in 29-33-3e.

**Creighton Drilling Co.,** Tulsa, is moving a rig to a wildcat location 4½ miles northwest of Weleetka, Okfuskee County, Oklahoma, where it will drill for F. A. Gillespie & Sons. The test, 1 Fleming, in 5-10n-11e, is projected to 3,100 ft. Location is a mile south of the Clearview gas field, nearest production.

**Woods Drilling Co.,** New Orleans, is moving in tools to drill 1 Harrison, SE SW 31-5n-3w, McClain County, Oklahoma. Hole will be carried to the third Bromide pay zone, expected around 10,400 ft.

**Ingram Drilling Co.,** Wichita Falls, Tex., which had the rotary contract on a shallow oil discovery well being completed by C. C. Hudspeth at 1 Annis, in the SW SE SW 26-7n-20w, 10 miles west of Hobart, Kiowa County, southwestern Oklahoma, has moved rig to a location 2½ miles north, where it will drill another wildcat test for Benson & Montin at 1 Newberry, SW SW SW 16-7n-20w. On the Hudspeth discovery well, rotary hole was drilled to 975 ft. and casing set to 994 ft. Joe Creel, Lawton, had the cable tool contract and completed the hole to 1,003 ft.

**Camay Drilling Co.,** Los Angeles, is the contractor at a new operation in the Del Valle area, Los Angeles County, California. The test, 1 Kinler, in 16-4n-17w, is being drilled for Southern California Petroleum Corp., of which it is an affiliate, under an operating agreement with Fred Goodstein, owner of Trigood Oil Co., Casper, Wyo. Prospective producing horizon is below 10,500 ft.

**Earl Wakefield,** Wichita, has a string of tools running for Watson Drilling Co. at 1 Kerr, a wildcat test in 34-34-2w, Sumner County, Southern Kansas.

**Morris Palmer** is the contractor on a wildcat test being drilled in the Estevan Moro Survey, Upshur County, East Texas, for Barney Carter. The test, 1 Peavy, currently is drilling near 4,000 ft.

**Seran Drilling Co.** is the contractor at Doak & Hughes 2 Frank, a newly started test in 20-12n-10e, on the south side of the Morse district, Okfuskee County, Oklahoma.

**Regent Drilling Co.,** Edmonton, has the contract for a third well to be drilled for Pan-Western Oils, Ltd., in the Leduc field, southwest of Edmonton, in Central Alberta Province. The rig now is on the company's second hole.

**Jackson Drilling Corp.,** Wichita, has the contract for an exploratory test which Westgate-Greenland Oil Co. is starting in 6-21-12, Stafford County, Kansas.

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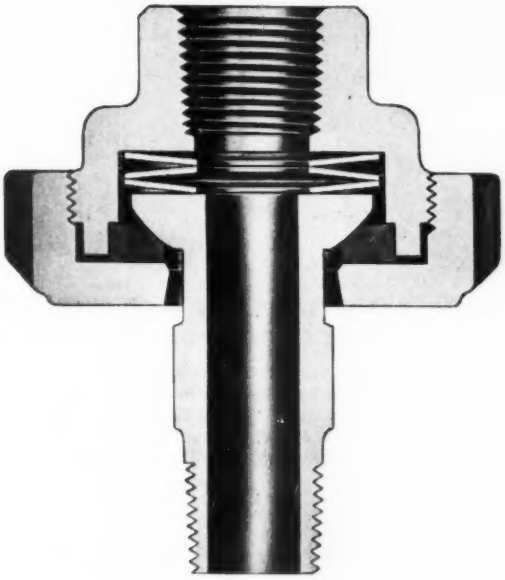

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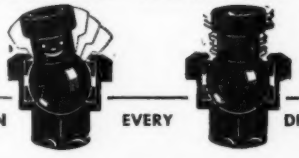

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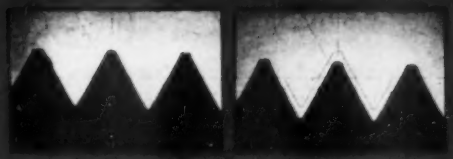

*Figures 1 and 2.* The above O-C-T precision thread was moved the exact distance of five threads. Note in Figure 2 how the thread exactly matches the lower form line, indicating both perfect lead and taper.

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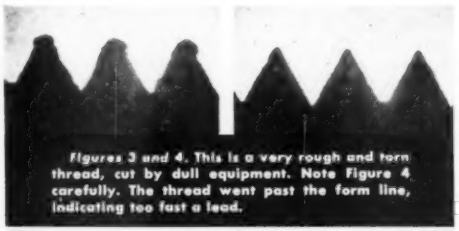
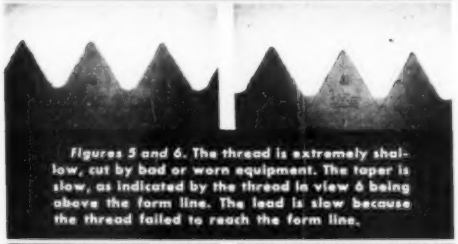
**The comparator checks the lead and taper of threads by fitting a thread in the upper form line, then moving over the *exact* required distance for five threads, after which the thread should exactly fit the lower form line. Figures 1 and 2 show how the O-C-T precision thread lives up to this requirement. Figures 3, 4, 5 and 6 show examples of how stock nipples obtained from supply stores failed to meet the critical eye of the comparator.**



*Figures 3 and 4.* This is a very rough and torn thread, cut by dull equipment. Note Figure 4 carefully. The thread went past the form line, indicating too fast a lead.



*Figures 5 and 6.* The thread is extremely shallow, cut by bad or worn equipment. The taper is slow, as indicated by the thread in view 6 being above the form line. The lead is slow because the thread failed to reach the form line.

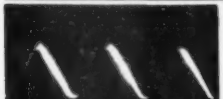


*Figure 7.* This shows the results of screwing a thread of imperfect lead into a thread of proper lead. The result is contact on only one side of the thread and resultant leak space shown by white area.

*Figure 8.* The result of screwing a shallow bottom thread into a perfect thread. The shallow bottom prevents contact on the tapered side of the thread, resulting in the leak space shown by white area.

Here are the results of the comparator tests! Judge for yourself.

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# NATURAL GAS

## Southern Natural Seeks to Expand Pipe-Line System

Southern Natural Gas Co., Birmingham, has asked Federal Power Commission to authorize construction of natural-gas facilities which will expand the capacity of its pipeline system by 109,000,000 cu. ft. daily, to a total daily capacity of 529,000,000 cu. ft., at an estimated cost of $32,520,000.

The firm said the proposed facilities would provide additional capacity to meet the increasing demands of its present market area, which includes Alabama, Georgia, Louisiana, and Mississippi. The company in addition said its proposed facilities will provide capacity for delivery of natural gas for resale in 38 counties in Alabama, Georgia, Mississippi, and South Carolina.

The proposed project includes construction of a total of approximately 803 miles of pipe line, including mainline additions, branch-line loops and connecting lines in Texas, Louisiana, Mississippi, Alabama, Georgia, and South Carolina; and installation of 19,200 in compressor horsepower. The 803 miles of line includes 496 miles of new high-pressure lines extending from the Gwinville (Miss.) gas field to Aiken, S. C.

## Hearing Set January 18 on Atlantic Seaboard Tariff

The Federal Power Commission has postponed until January 18 a hearing previously scheduled to begin in Washington, D. C., January 11 in the proceeding involving suspension of Atlantic Seaboard Corp.'s proposed natural-gas tariff.

Washington Gas Light Co. and Washington Gas Light Co. of Maryland, Inc., interveners in the proceeding, requested the postponement.

## FPC Denies Motion in New York Gas-Service Proposal

Federal Power Commission has denied motions of New York State Natural Gas Corp., Central New York Power Corp., and New York Power & Light Corp., to omit intermediate decision procedure in the proceeding involving the companies' proposals to build pipe-line facilities which would carry additional natural gas for distribution in Oswego, Onondaga, Madison, Oneida, Fulton, and Herkimer counties in New York State.

FPC said that while the record shows that the firms plan to complete the proposed facilities so as to begin service by September 1950, it does not show that the contemplated service will be delayed by reason of following the intermediate decision procedure.

Hearings on the applications were completed December 20.

## Delhi Oil Prevented From Entering El Paso Case

Delhi Oil Corp. has been prevented from participation in hearings which began last week in Washington, D. C., before Federal Power Commission, on application of El Paso Natural Gas Co. to build a natural-gas line from the San Juan basin to the Arizona-California border. It is from Delhi Oil that El Paso Natural hopes to obtain substantial gas supplies for its proposed line.

As the proceedings opened, a Delhi representative asked the FPC presiding examiner for permission for Delhi to participate in the hearing pending action of FPC on the request of Delhi to consolidate its status-determination case with the El Paso case for hearings. The examiner said that in view of the fact Delhi's request had been a matter of consideration by the commission, but had not been acted upon, he would have to deny the request.

## Nearly 4 Trillion Cubic Feet of Gas Sold in 1948

A total of 3.99 trillion cubic feet of natural gas was sold during 1948 by 121 companies reporting to the Federal Power Commission, the commission's annual publication, "Statistics of Natural Gas Companies," discloses. Operating revenues of the companies totaled $964,551,000 during the year.

Revenues from natural-gas sales during 1948 amounted to $865,606,000, representing an increase of 18 per cent in revenues over $735,568,000 in 1947. Service was supplied to 4,802,000 customers during the year, an increase of 5 per cent over the 4,563,000 reported in 1947.

Book investment in gas utility plants aggregated $3,026,435,000, an increase of $413,313,000, or 16 per cent over the $2,613,122,000 reported in 1947, FPC said. Reserves for depreciation amounted to $862,962,000 at the end of the year compared to $810,780,000 at the end of 1947.

## United Natural Gas' Rate Investigation Terminated

An investigation instituted December 20, 1948, of the rates charged by the United Natural Gas Co., Oil City, Pa., for sale of natural gas subject to Federal Power Commission jurisdiction has been terminated by the commission.

FPC said that it is unnecessary to continue the investigation because of a reduction in rates and charges which the firm has made effective January 1 under a gas tariff filed December 1, 1949.

The tariff provides for a reduction of approximately $252,000 in annual revenues from natural gas sold for resale.

## Manufacturers Light & Heat Completes New Facilities

Manufacturers Light & Heat Co. has completed an $87,000 construction project which will assure its customers in the northeastern counties of Ohio and the Beaver Valley area of improved natural-gas service.

E. D. Clutter, general superintendent of the firm, said that new direct-driven rotary-type compressors have been added to the firm's pumping equipment at the Brinker compressing station near Leetonia, Ohio.

Addition of the new compressors gives the Brinker station 1,605 hp. available to pump a maximum of 18,000,000 cu. ft. of gas daily from an underground storage reservoir to customers in adjacent counties.

# Natural Gasoline

## Shell May Build Gasoline Plant in Elk City Field

Plans for a natural-gasoline plant in the Elk City field of Beckham and Washita counties, Oklahoma, which would handle approximately 100,000,000 cu. ft. of gas daily, and which would cost approximately $6,000,000, are being considered by Shell Oil Co., according to H. W. Penterman, executive assistant to W. A. Alexander, Shell's area manager in Tulsa.

Penterman told a recent Elk City Rotary Club meeting that Shell is contemplating such a plant, but added that:

"The size and type of plant, if built, will depend on how the field develops and what type of handling is necessary to obtain the best results, but in any event the cost of such a plant would probably range in the neighborhood of $6,000,000."

Penterman said that in addition the cost of operating such a plant would be around $500,000 per annum.

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# REFINING

## T.C.C. Unit Operation Is Changed at Torrance Plant

A Thermofor catalytic cracking unit at General Petroleum Corp.'s Torrance, Calif., refinery was recently switched from straight-run gas oil charge to cracked gas oil produced on the delayed coking unit.

The company reported that this cracked stock produces slightly less gasoline than it obtained from the straight-run charge, but the operation is desirable since it reduces the supply of cracked gas oil which currently exceeds fuel-oil blending requirements.

Crude runs at the refinery averaged over 108,000 bbl. per day during November, but despite this high rate the refinery had 25,000 bbl. more in storage at the end of the month than at the beginning, the company reported.

Operations during November were normal, and only a few short shutdowns occurred. The visbreaker was taken off stream for 48 hours to clean out the coke deposited during a power outage in October. Two T.C.C. units were off stream for 12 hours each to make minor kiln repairs.

Due to lack of shutdowns, the company's engineering-construction department caught up on the backlog of maintenance and new construction work that had previously been accumulating, the firm said.

## Final Payment Is Made on Sunray's Duncan Refinery

Sunray Oil Corp. has sent a $3,060,000 check to the treasurer of the United States as final purchase money obligation on the 20,000-bbl. daily catalytic cracking refinery at Duncan, Okla., which was acquired by the company from War Assets Administration in a sealed-bid sale at Tulsa in September 1947.

This, as principal balance out of an original $5,100,000 obligation was paid out of current funds and reduces the company's funded indebtedness in this amount, Sunray reported.

Payment eliminates the entire indebtedness against the company's largest refinery, and thus reduces current interest requirements of approximately $120,000 per annum. Under terms of the 1947 purchase agreement, Sunray would have had until 1957 to pay out the obligation.

Since its acquisition, Sunray's Duncan refinery has been improved and remodeled at an expenditure to the company of several million dollars. These improvements included remodeling of processing units, storage and tankage, crude and products pipe lines, and pipe-line stations.

## Esso Standard Cuts Water Usage at Bayonne Refinery

Esso Standard Oil Co.'s Bayonne, N. J., refinery has cut its water consumption 440,000 gal. daily since August 31, G. A. Esty, general superintendent, reported.

He said that the water economy has been made as a result of certain operational changes as well as conservation in the use of steam, electricity, and water itself.

The Bayonne region is undergoing a serious water shortage, along with the entire New York City metropolitan area, and every effort is being made by all industries to conserve the fluid until reservoirs can be replenished.

## Explosion and Fire Damage Aurora's Detroit Refinery

An explosion and fire which occurred at Aurora Gasoline Co.'s refinery at Detroit recently did damage estimated at $50,000 to one unit in the cracking plant, and resulted in five deaths.

W. E. Slaughter, Jr., president of the firm, set the $50 000 estimate on the damage, and said that the cracking unit was completely demolished.

Cause of the explosion had not been determined immediately, but reports indicated it was set off by sparks from a hammer striking a steel pipe. Exploding gasoline fumes set off the fire, which was extinguished with foam spray.

The refinery has a crude-oil capacity of 16,000 bbl. per day. L. A. Curran is general superintendent.

## New-Type Automobile Fuel Is Developed in Britain

A new-type fuel has been successfully compounded by British scientists, to take the place of gasoline in cars and other light vehicles. As a result, British motorists for the first time since gasoline rationing was instigated have been able to purchase automobile fuel without resorting to coupons, according to reports.

Called "Baxtrol," the new fuel is the result of 2 years of study by Stockport Laboratories experts in Cheshire. It is made of the by-prod-

ucts of petroleum distillation, using mainly methanol and acetone. Baxtrol can be used pure, necessitating a slight carburetor adjustment, or enriched by a quart of gasoline.

## Two Phillips Chemical Co. Plants to Be Finished Soon

Two plants of Phillips Chemical Co. are scheduled for probable completion in March, the company has announced.

Now under construction is a fertilizer plant at Etter, Tex., which will produce 300 tons of the product daily; and facilities to increase capacity of the firm's Cactus ammonia plant at Etter to 440 tons daily.

The company announced that two projects were completed during 1949. These are the nitric acid plant at Etter, with a capacity of 225 tons daily, and facilities increasing capacity of the firm's carbon black plant at Borger, Tex., to 8,000,000 lb. per year.

## Fuel-Oil Use by Electric Utilities Shows Big Gain

Fuel-oil use by electric-utility plants jumped 104.9 per cent in November 1949 over the same month in 1948, according to a report issued by Federal Power Commission. At the same time coal consumption by the plants dropped 22 per cent, the report showed.

FPC said fuel-oil consumption by electric utilities reporting to it amounted to 7,316,302 bbl. during November, a 9.9 per cent increase over October's record of 6,655,555 bbl. A year earlier consumption was 3,571,311 bbl.

## Tide Water Is Training Personnel for New Plant

Tide Water Associated Oil Co., Tulsa, which now has under construction a new Houdriflow catalytic cracking unit at its Drumright, Okla., refinery, has under way a comprehensive training program for personnel who will operate the new facilities.

The new unit is expected to go on stream before March 1 *(The Oil and Gas Journal, December 1, 1949, page* 104). At year's end work was 85 per cent complete on the $1,000,000 expansion and modernization program, and practically all heavy construction work on the cracker was finished.

Installations include a new pump house and control rooms. The Houdriflow unit will be turned over to the operating company by Process Engineers, Dallas, general contractors, about February 15, according to reports.


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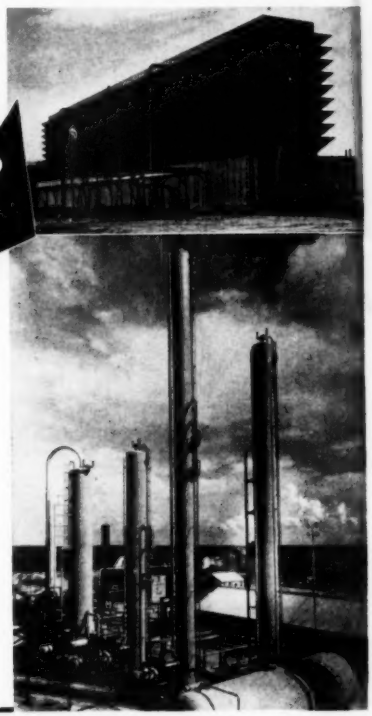

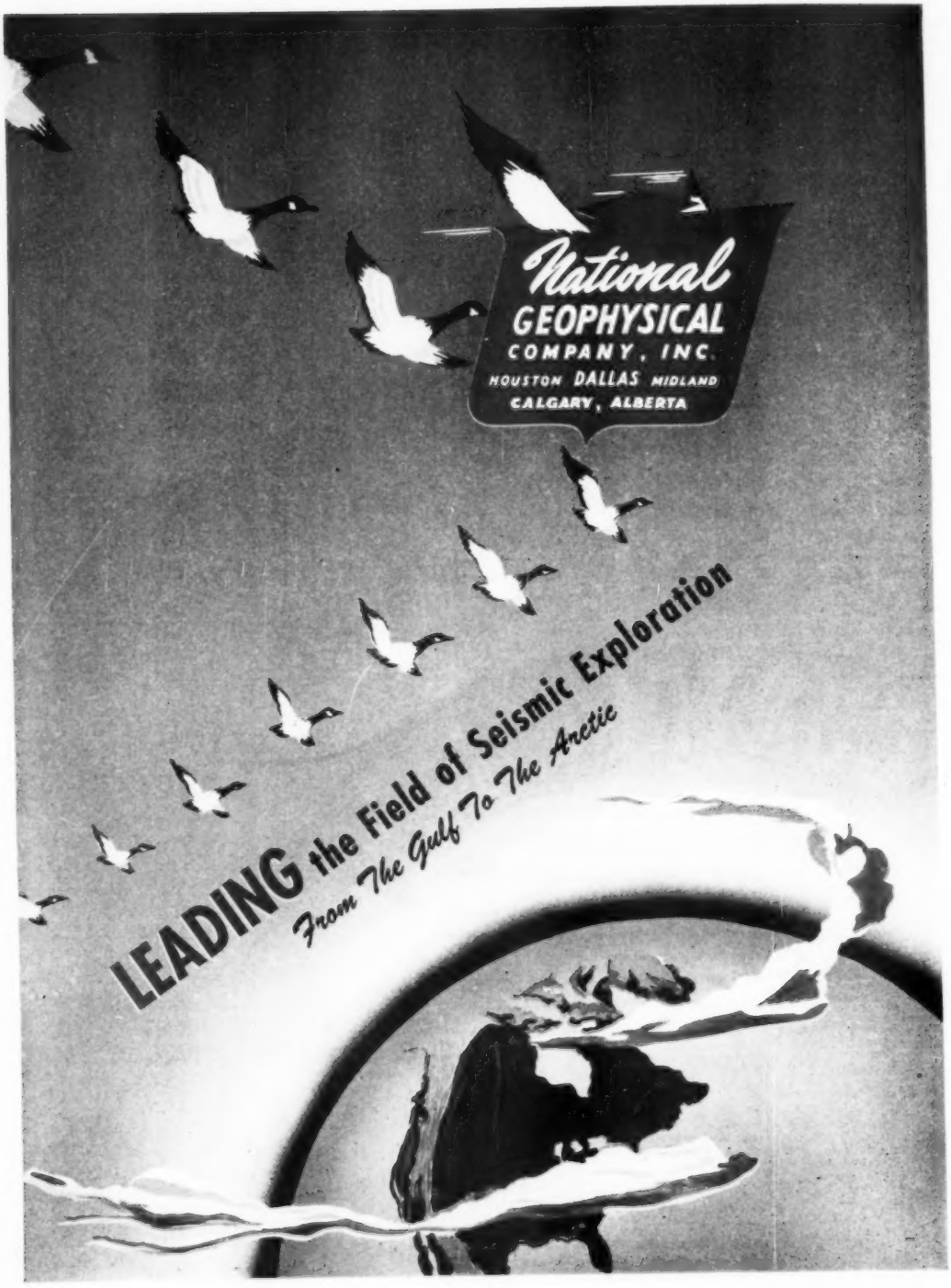
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# Exploration and Drilling

## 1950 Problems of Exploration Scientists

A SUMMARY of the thinking among exploration scientists about what are the important problems to be solved in 1950 can be generalized under two points: (1) Improve the quality of your product or service as much as possible. (2) If consistent with improved quality, cut your costs as much as possible.

Most business men would agree with these objectives, although wondering why point two was qualified so heavily. The answer, according to executives in the exploration field, is very simple. The objective of exploration expenditures is the acquisition of lease acreage, and picking a location for a wildcat well.

The cost of the leases plus the cost of drilling the test well will usually run many times the outlay for scientific investigation. Even at the best, a high percentage of these wildcat tests are dry. Therefore a small percentage reduction in wildcat failures will cut total exploration costs more than a large percentage reduction in outlays for scientific investigation. Eliminating the drilling of a few dry holes will pay for a lot of geological and geophysical expense.

Getting these general principles down to practical details, here are some of the points on which there seems to be fair agreement. First, better interpretation of geophysical work in terms of geology. The emphasis on reef exploration has merely brought to a quick head a steadily growing trend in this direction that is at least several years old.

Pointing to cases where the first geophysical interpretation resulted in a dry hole, after which reinterpretation resulted in a new oil field, some geologists claim (and many geophysicists back them up) that it would have been much cheaper to have had closer liasion between geologist and geophysicist in the beginning. That might have increased the cost of the original geophysical work. More detail might have been required to settle a point in dispute between geophysicist and geologist. But it might also have eliminated the cost of the first dry hole. It isn't considered good manners to speculate about whether some prospects dropped after one dry hole might have produced if a second test had been drilled after a reinterpretation of the geophysical-geological picture. It has been known to happen, but with a different company drilling the second well, after the original prospector had dropped his lease.

A second practical detail is the improvement of geophysical instruments themselves. All electrical and radioactive logging devices are geophysical instruments, although, as some geophysicists are quick to point out, many geologists fail to realize that fact. In the logging field, 1950 is expected to see more practical application and experience with a lot of the newer developments in electrical logging. If rumors are true, as they are likely to be in this case, 1950 may see a lot of new things in radioactive logging announced, and probably put into use.

In the logging field, some geologists say they would like to see developments that will give them more data on the location of cracks and minor fissures in pay zones. Some pays show little or no porosity or permeability of the conventional type, yet produce substantial flows of oil for good acre yields from cracks and crevices. A lot of Ellenburger wells in West Texas fit this classification; there are also tight, comparatively impermeable sands which are known to produce a lot of oil. Furthermore, some engineers and geologists advance rather reasonable theories to indicate that the sometimes sensational increased production from acidization of limes; the Hydrafrac process, and the old-fashioned shooting of sand pays, get results by producing cracks and minor fissures.

Summing up then, a large number of executives say they can foresee an improvement in the geophysical tools and considerable improvement in the interpretation of their evidence. There is the intangible item of the brains, imagination, and hard work of the geologists who will use this evidence. Most executives agree that their staffs are better balanced, better trained, better organized, and have a more even distribution of experience than at any time since the beginning of World War II.

Another intangible trend is that many consulting geologists report that financing wildcat tests is still not a serious problem, if the quality of the prospect is high. The money is available, but the investor is more insistent on quality. He wants a good run for his money, not a long shot grab-bag prospect.

*Charles J. Deegan*

### HIGHLIGHTS OF WEEK'S DEVELOPMENTS

**MISSISSIPPI.**—Two Adams County wildcats are in the process of being completed as discoveries after drill-stem tests had good shows of oil. Nine miles south of Natchez, Humble Oil & Refining Co. reported a flow of 168 bbl. of 27°-gravity oil in the 1 Mrs. Roane F. Byrnes. Drill-stem test was made around 11,000-10 ft. One-half mile south of the same city, Humble's D-1 Mrs. C. L. S. McKittrick, et al., flowed 125 bbl. of 26.8°-gravity oil on tests presumably in the lower Tuscaloosa.

**WEST TEXAS.**—The Texas Co. 1 P. L. Fuller, ½-mile north extension to North Snyder, Section 497, came in for a natural daily flowing potential of 859.6 bbl. of 43°-gravity oil. Completion was through 1-in. opening, from 6,812-90 ft., TD. A new pay section in the Strawn, in an old well drilled deeper, extended Susan Peak field limits, Tom Green County.

**WEST CENTRAL TEXAS.**—Gem Oil Co. 1 Medrano, Ellenburger prospect 8 miles west of Rotan, had resumed swabbing operations after treating with 1,500 gal. of regular acid.

# KANSAS

## Trego County Adds Pool By Continental Discovery

CONTINENTAL OIL CO. 1 Walz, SE SE NE 14-11-21, prospective new pool opener in the northeast corner of Trego County, made 121 bbl. of 31.6° oil in 8 hours on a late swabbing test. Production is from Arbuckle lime, topped at 3,774 ft. (—1,571 ft.) with hole open at 3,778-90 ft. After plug was drilled it bailed at the rate of only ¾ bbl. per hour, which was without acidizing. Following a 500-gal. acid treatment, it swabbed 1.67 bbl. of oil per hour for 10 hours. An additional injection of 1,500 gal. of acid then was given, and since then production has increased substantially. Nearest other production is in the Nicholson pool, about 3 miles southeast in Ellis County.

In western Rice County, Sohio Petroleum Co. and Derby Oil Co. 1 Reif, NW NE SW 31-18-10, a wildcat 1½ miles west of the Ringwald pool, has casing run to the top of the Arbuckle at 3,273 ft. (—1,526 ft.) after encountering favorable oil showings with rotary hole drilled 1 ft. in the top. The well also encountered good saturation in the Lansing-Kansas City, topped at 2,947 ft. (—1,200 ft.). A drill-stem test in that pay at 3,028-40 ft. gave a recovery of 120 ft. of oil and 100 ft. of oil and gas-cut mud.

In Southwestern Rooks County, Nadel & Gussman have another prospective new pool opener in their 1 Sutor, NE NE SE 26-10-20, 1½ miles southwest of the Berland pool. In Arbuckle lime, topped at 3,728 ft. (—1,579 ft.), a drill-stem test at 3,729-33 ft. recovered 150 ft. of free oil. Casing has been run to 3,729 ft.

Skelly Oil Co. got a recovery of 120 ft. of heavily oil and gas-cut mud in a drill-stem test at 3,607-18 ft., in the top of the Arbuckle lime at its 1 Schlegel, NW SE SW 14-17-16, 4 miles north of the Otis gas field, nearest production, in Rush County. Casing has been run to the top.

### KANSAS WILDCAT FAILURES

Ellis County: Jones, Shelburne & Farmer 1 Weisner, NW NW NW 36-12s-20w, dry, TD 3,945 ft.

Anschutz 1 State, SE SE NW 31-13s-18w, dry, TD 3,785 ft., Topeka 3,089 ft., Hoxbar 3,315 ft., Totonto 3,340 ft., Lansing 3,359 ft., conglomerate 3,650 ft., Arbuckle 3,743 ft.

Lindas Oil Co. 1 Phillip, SW SE NE 4-15s-17w, dry, TD 3,510 ft., anhydrite 1,072 ft., Hoxbar 3,158 ft., Lansing 3,205 ft., conglomerate 3,455 ft., Arbuckle 3,491 ft.

Graham County: Barnett Drilling Co. et al 1 Napue, NE NE SW 4-9s-21w, dry, TD 3,738 ft., anhydrite 1,660 ft., Hoxbar 3,326 ft., Lansing 3,366 ft., basal Kansas City 3,586 ft., Arbuckle 3,726 ft.

Kingman County: Herndon Drilling Co. 1 Gilbert, NW NW SW 25-29s-10w, dry, TD 4,736 ft., Hoxbar 3,389 ft., Douglas 3,470 ft., lime 3,601 ft., Lansing 3,619 ft., Mississippian 4,234 ft., Kinderhook 4,312 ft., Viola 4,530 ft., Simpson 4,582 ft., Arbuckle 4,695 ft.

Rice County: National Associated Petroleum Co. 1 Proffitt, NE SW NW 30-21s-9w, dry, TD 3,500 ft., Lansing 3,002 ft., basal Kansas City 3,318 ft., Viola 3,345 ft., Simpson shale 3,410 ft., Simpson sandy dolomite 3,421 ft., Arbuckle 3,468 ft.

Russell County: Anschutz 1 Ross, SW SW SE 26-12s-15w, dry, TD 3,315 ft.

Scott County: Texas Co. 1 Lang, NE NE SW 1-20s-34w, dry, TD 5,105 ft., anhydrite 2,220 ft., upper Ft. Riley 2,860 ft., lower Ft. Riley 2,920 ft., Hoxbar 3,874 ft., Lansing 3,912 ft., basal Kansas City 4,318 ft., Mississippian 4,756 ft., St. Louis 4,794 ft., Spurgeon 5,028 ft.

Stafford County: Keys Drilling Co. 1 Eastabrook, SW NW NW 2-21s-11w, dry, TD 3,388 ft., anhydrite 465 ft., Hoxbar 2,919 ft., Topeka 2,687 ft., lime 3,046 ft., Lansing 3,071 ft., Topeka 2,687 ft., conglomerate 3,318 ft., Arbuckle 3,365 ft.

Crown Oil Co. 1 Firebaugh, SE SE SE 21-23s-13w, dry, TD 4,085 ft., anhydrite 765 ft., Hoxbar 3,346 ft., lime 3,481 ft., Lansing 3,502 ft., Viola 3,906 ft., Simpson 3,947 ft., Arbuckle 4,055 ft.

# SOUTHWEST TEXAS

## Texaco to Complete Oil Discovery in Duval County

CORPUS CHRISTI.—The Texas Co. is preparing to complete the 1 Duval County Ranch Co. O/A NCT-3 for an oil discovery after running a series of drill-stem tests. Operators drilled to a depth of 2,700 ft., and drill-stem test was run from 2,407-15 ft., recovery being 5 ft. of gas-cut mud in 7 minutes with 550 psi. working pressure. On 35-minute drill-stem test at 2,419-21 ft., the well recovered 100 ft. of oil and 25 ft. of oil-cut mud. Another test run from 2,422½-31 ft. recovered 180 ft. of oil-cut mud and 570 ft. oily brackish water in 35 minutes. The potential discovery is located 7½ miles southwest of Freer, Duval County, in the Guadalupe Cano Survey 584.

Two miles west of New Berlin, in Guadalupe County, Morris Cannan is testing in the 1 Louis Koepp, prospective oil discovery. The hole was cored from 1,538-54 ft., topping the chalk at 1,538 ft. which was saturated with a good show of oil. It cored dense chalk from 1,554-59 ft. An electric log was run and 5½-in. production casing set at 1,520 ft. Open hole from 1,520-59 ft. was acidized with 2,000 gal. of acid and operators are now testing.

Luling Oil & Gas Co., San Antonio, has run a potential on the 1 Florencia Garcia, a new gas discovery 9 miles northwest of San Diego, Duval County. Hole was drilled to a depth of 3,310 ft. and 5½-in. casing set at 3,293 ft. Through perforations from 3,266-82 ft., the well flowed 2,280,000 cu. ft. of gas on open flow. Shut-in pressure was 1,068 psi. The discovery is located in the M. G. Perez Survey 412.

Frank W. Michaux has completed the 2 Virgin A. Bergh, Tr., for a new pay discovery in the North Magnolia City field of Jim Wells County. Hole was drilled to a depth of 5,467 ft. and operators set 5½-in. casing at 3,592 ft. Through perforations from 3,433-60 ft. the well flowed 26,000,000 cu. ft. gas daily with shut-in pressure being 1,300 psi. Other production in the field is in the 3,600-ft., 3,700-ft. and 5,400-ft. sections.

### SOUTHWEST TEXAS (DISTRICTS 1 AND 4) SUCCESSFUL WILDCATS

Duval County: Gas discovery—Luling Oil & Gas Co. 1 Florencia Garcia, M. G. Perez Sur. 412, 9 mi. NW of San Diego, TD 3,310 ft., perf. 3,266-82 ft., IP 2,280,000 cu. ft. gas daily, open flow, SIP 1,068 ft.

Jim Wells County: New pay at No. Magnolia City—Frank W. Michaux 2 Virgil A. Bergh, Tr., Jose Pacheco Sur., A-337, TD 5,467 ft., perf. 3,433-60 ft., IP 26,000,000 cu. ft. gas per day, open flow, SIP 1,300 psi.

Starr County: Gas discovery—"El Ebanito"—Baldridge & King, Inc., 1 T. B. Slick Estate, El Panal Gr., 2½ mi. N-NE of Flores gas field, 11 mi. N of Sullivan City, TD 7,206 ft., perf. 7,080-104 ft. (Vicksburg), IP no gage, SIP 3,600 psi.

### SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT FAILURES

Duval County: Morris Cannan 1 J. M. Bennett, 4 mi. SW of Driscoll field, Sur. 444, 8 mi. NW of Realitos, dry, TD 3,084 ft.

Cox & Hamon 1 Dunn Estate, AB&M Sur. 379, 8 mi. W of Realitos, dry, TD 4,110 ft.

LaSalle County: Parker & McCune 1 Mable I. Wilson, Caleb R. Bostick Sur. 74, A-70, 8.6 mi. NW of Zella Siding, dry, TD 6,362 ft.

# N. CENTRAL TEXAS

## Fisher County Wildcat Loses Swab in Hole

WICHITA FALLS.—Gem Oil Co. 1 M. Medrano, SW NW 104-2-H&TC, northwest Fisher County wildcat, 8 miles west of Rotan, and some 10 miles northeast of Baxter et al 1 Feldman (Scurry County), swabbed 2 bbl. of oil an hour from the Ellenburger, prior to losing the swab and line in the hole.

The Ellenburger prospector had top of that formation at 6,959 ft. Elevation was not reported. A core from 6,953-63 ft. recovered 7 ft. of saturated section, with free oil in the core barrel; then a 1-hour drill-stem test from 6,961-82 ft. recovered 960 ft. of oil and 90 ft. of oil-cut mud, with no water. Flowing pressure was 200 psi., and shut-in pressure 1,750 psi. A core from 6,988-7,003 ft. recovered fractured dolomite with oil and gas shows, and no water.

Further drill-stem tests and recoveries were: From 6,957-70 ft. recovery was 30 ft. of slightly oil and gas-cut mud, time not reported. From 6,963-82 ft., open 1 hour, recovery was 1,700 ft. of gas and 20 ft. of free oil, plus 90 ft. of heavily oil and gas-cut mud. Gravity of the oil was 41.8°. A 5-hour test from 6,963-82 ft. had about the some recovery, but with 60 ft. of free oil. From 6,963-7,003 ft., open 3½ hours, recovery was 1,350 ft. of gas and 100 ft. of heavily oil and gas-cut mud. A 1-hour test from 6,990-7,073 ft. recovered 180 ft. of gas and 280 ft. of slightly oil and gas-cut mud, plus 180 ft. of muddy sulfur water. Operators set 5½-in. casing to 7,070 ft., drilled out to 7,053 ft. and perforated with 130 jet shots from 6,957-6,980 ft., washed with 500 gal. of mud acid, and were swabbing when tools were lost in the hole.

In southwestern Fisher County, H. C. Spoor, Jr., et al 1 L. L. Stuart, 201-3-H&TC, recovered 150 ft. of drilling mud on a 45-minute drill-stem test at 6,022-70 ft. Top of the reef was reported at 6,010 ft., and total depth at 6,070 ft.

In Runnels County, William Hamm, Jr., and Fred Manning, Inc., 1 Charity Pace, Lela Forsyth Survey 450, 1½ miles southeast of Wingate, was drilling hard sand at 5,043 ft.

Hamm's 2 S. L. McNay, Jose Maria Garcia Survey, in the new Strawn producing area 3½ miles northwest of Wingate, was drilling below 4,048 ft.

American Trading & Production Co. 2 Mrs. Carrie E. King, M. Parramore Survey 26, in the new Florance field, had total depth at 4,000 ft., plugged back to 2,375 ft., and perforated casing with 30 shots from 2,355-60 ft. At last report it was flowing approximately 75 bbl. of oil a day and was to continue testing.

### NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B)

Clay County: New field; Continental Oil Co. 2 L. M. Staley, 660 ft. from east and south lines, N½ Sec. 1, H&TC Sur., A-253, 4 mi. NW Ringgold, TD 5,921 ft., top Bend conglomerate pay 5,903 ft., perforated 5,908-21 ft., IP pumped 98 bbl. 42°-gravity oil a day, GOR 228 cu. ft.

Jack County: Hanlon-Boyle, Inc., 1-S J. R. Dodson, J. W. Williams Sur., A-877, 7 mi. S Antelope, TD 392 ft., top oil sand 385 ft., IP pumped 15 bbl. a day.

New field: Mid-Continent Petroleum Corp. 1 Roy Cherryhomes, 330 ft. from south, 3,580 ft. from W lines, J. Irvine Sur., A-313, 2 mi. NW Cundiff, TD 6,649 ft., top Ellenburger 6,554 ft., Ellenburger pay 6,637-49 ft., IP flowed 360 bbl. 47°-gravity oil a day, 20/64-in. choke, GOR 1,370 cu. ft., TP 300 psi., CP 700 psi.

Montague County: Bowie field extension; B. F. Phillips, Jr., 1 H. Husfield, 467 ft. from NW, 467 ft. from NE lines, Blk. 70, Hill CSL Sur., 4 mi. E. Bowie, TD 6,318 ft., elevation 1,089 ft., conglomerate

(?) pay 6,183 ft., IP pumped 111.9 bbl. 38°-gravity oil a day, GOR 250 cu. ft.

**NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) WILDCAT FAILURES**

Archer County: Fortex Oil Corp. 1 "E" L. F. Wilson, Blk. 36, ATNCL Sur., 10 mi. N Archer City, dry, TD 4,512 ft.

Henry Grace Production Co. 1 C. R. Lemmond, Sec. 2, BBB&C Sur., A-842, 4½ mi. NE Farmer, dry, TD 3,854 ft.

Jack County: Russell Maguire 1 Dora Shawver, Jos. Turner Sur., A-609, 3½ mi. NE Perrin, dry, TD 4,942 ft.

## LA.-ARK.

### Murphy's Pepper 1 Has Oil Discovery Prospects

SHREVEPORT.—C. H. Murphy 1 Pepper, SE NE 32-18s-15w, Union County, Arkansas, wildcat on the edge of an old shallow producing area, had discovery prospects on the basis of a drill-stem test. The latest test, from 6,604-12 ft., through ¼-in. top and bottom chokes, recovered 4,800 ft. of oil, plus 30 ft. of oil-cut mud, in 20 minutes. Flowing pressure was 1,960 psi. Previous drill-stem tests recovered oil at 6,009-21 and 6,206-14 ft., identified as the Cotton Valley formation. Operators were coring ahead to determine the formation thickness.

New exploration tests for Arkansas included Spartan Drilling Co. 1 Claud Everett, SE SE NW 36-17s-15w, on the west edge of the Nick Springs field. Projected depth was 4,500 ft.

Spartan Drilling Co. also made location for a 7,700-ft. test about 2 miles south of the Cairo field, which is to be the 1 Sally Irby, NE SE 22-18s-17w.

C. H. Murphy 1 Gregory, 9,500-ft. wildcat test in the southwest corner of Union County, in SE SW 28-19s-18w, was coring ahead at 8,601 ft. Operations had been delayed several days by a stuck drill stem at 8,543 ft.

**NORTH LOUISIANA SUCCESSFUL WILDCAT**

Caddo Parish: Plymouth Oil Co. 1 Thigpen-Herold, NE NE SE 12-17n-16w, TD 6,503 ft., elevation 197 ft., perforated Hill zone of Rodessa 4,779-4,803 ft., IP flowed 30 bbl. 43°-gravity oil a day, ¼-in. choke, TP 750 psi., GOR 7,800 cu. ft., Greenwood field suggested name.

**NORTH LOUISIANA WILDCAT FAILURES**

Grant Parish: Justiss-Mears Oil Co. 1 Lee Lumber Co., SE NE 15-6n-2e, dry, TD 4,891 ft., elevation 43 ft., Wilcox 2,775 ft.

LaSalle Parish: H. L. Hunt F-182 Nebo, NE NE 25-7n-2e, dry, TD 4,500 ft., elevation 161 ft.

Winn Parish: Pan American Production Co. 1 E. M. Allbritton, SE SE SE 5-10n-1e, dry, TD 1,541 ft., elevation 122 ft., Wilcox 1,464 ft.

**ARKANSAS WILDCAT FAILURES**

Dallas County: Jack Voyles 1 Edwin Anthony, NE NW SW 26-10s-16w, dry, TD 1,885 ft.

Hempstead County: C. M. Bagley 1 Derryberry, NW NW SE 3-11s-24w, dry, TD 2,713 ft., elevation 423 ft., Cotton Valley 1,898 ft.

Lafayette County: E. L. Pinkston 1 W. M. Davis, NW NE NW 16-16s-23w, dry, TD 4,015 ft., elevation 279 ft., Midway 1,125 ft., Arkadelphia 1,750 ft., Nacatoch 1,915 ft., Saratoga 2,287 ft., base annona 2,621 ft.

Union County: H. B. Brown 1 Union Sawmill, NE SW SW 16-19s-13w, dry, TD 3,513 ft., elevation 234 ft., Midway 1,550 ft., Arkadelphia 2,100 ft., Nacatoch 2,274 ft., Saratoga 2,403 ft., Tuscaloosa 2,886 ft., lower Cretaceous 3,050 ft., James 3,066 ft., Hogg sand equivalent 3,312-50 ft., no shows, Travis Peak 3,411 ft.

## MISSISSIPPI

### Humble Continues Testing Of Adams County Well

JACKSON.—Approximately 9 miles south of Natchez, in Adams County, Humble Oil & Refining Co. continues to test the 1 Mrs. Roane F. Byrnes from perforations opposite Lower Tuscaloosa sand. First perforations at 11,020-30 ft. tested salt water and were squeezed off. Another test with packer set at 10,939 ft. and using ½-in. top and 3/16-in. bottom chokes reported a flow of 168 bbl. of 27°-gravity oil plus 15 per cent salt water. Top pressure was 30 psi.

In the Sunniland field of Collier County, Florida, Humble Oil & Refining Co. has completed one of the field's best producers. The test, Humble B-4 Lee Tidewater Cypress Lumber Co., is bottomed at 11,576 ft. and is producing from open hole with 5½-in. casing set at 11,532½ ft. The well flowed 413.76 bbl. of 26.4°-gravity oil daily on 20-hour potential. Tubing pressure was 734 psi.

Another Adams County wildcat, approximately ½ mile south of the City of Natchez, is in the process of being completed, but none of the core descriptions, sample tops, Schlumberger tops, or sidewall-core descriptions have been released by operators. Humble D-1 Mrs. C. L. S. McKittrick et al, 50-7n-3w, was drilled to a depth of 10,548 ft. and 7-in. casing was set to 10,422 ft. Drill-stem test at 10,300-10 ft. with packer set at 10,240 ft. and using 3/16-in. top and bottom chokes, recovered 180 ft. of mud and 200 ft. oil and gas-cut mud. Well was then treated with 750 gal. of mud acid under 1,000 psi. pressure. After acid treatment, a drill-stem test was run with packer set at 10,270 ft. Tool was open 14 hours and the well flowed at the rate of 125 bbl. of 26.8°-gravity oil per day with top pressure of 1,000 psi.

This wildcat was rumored to have encountered 8 ft. of sand with show of oil at 4,430-38 ft. in the Wilcox and that top of Wilcox was high structurally. Although no geological information has been released, the depth of the perforations would indicate that tests are in the Lower Tuscaloosa.

**MISSISSIPPI WILDCAT FAILURES**

Jefferson County: L. M. Lockhart 1 Lillie Hence, 40-8n-1w, dry, TD 6,510 ft.

Lamar County: Honolulu Oil Corp. 1 Newman Lumber Co., 22-5n-16w, dry, TD 9,712 ft.

## APPALACHIAN FIELD

### Deep Wildcat Found Dry After Oil and Gas Shows

PITTSBURGH.—A deep wildcat in Lincoln district, Wayne County, West Virginia, is being plugged after attempts were made to produce but insufficient volumes of gas resulted. It is United Fuel Gas Co. 42-6181 F. D. Caldwell, elevation 688 ft., completed at a depth of 7,900 ft. Shows of gas were encountered in the Corniferous lime and in the Knox sand which also had a slight show of oil. Two Oriskany locations were staked by this same company in Tucker district, Wirt County, on the Belleville Quadrangle: 6550 T. S. Counts, elevation 945 ft., 3.2 miles south of Lat. 39° .05′, and 3.1 miles west of Long. 81° 30′; 6552 R. J. Moore, elevation 994 ft., 3.25 miles south of Lat. 39° 0.5′, and 3.60 miles west of Long. 81° 30′.

In Croyle Township, Cambria County, Pennsylvania, Peoples Natural Gas Co.


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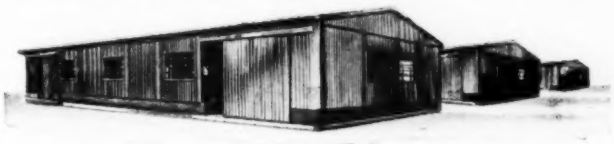

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1-3378 Joseph Gavany, elevation 2,245 ft., encountered gas gaging 2,000,000 cu. ft., but blew down to 100,000 cu. ft. at a depth of 3,259 ft. Drilling is continuing. In Napier Township, Bedford County, South Penn et al, Snee & Eberly 1 Jesse B. Miller, elevation 1,666 ft., is drilling at 5,647 ft.

**WEST VIRGINIA WILDCAT FAILURE**

Wayne County, Lincoln district: United Fuel Gas Co. 42-6181 F. D. Caldwell, dry, Corniferous lime 3,105 ft., show of gas 3,287 ft. and 3,770 ft., Knox sand 7,164-7,900 ft., show of gas 7,160-7,162 ft., show of oil 7,168 ft., TD 7,900 ft.

## TEXAS GULF COAST

### Magnolia Testing Austin County Discovery Well

HOUSTON.—Magnolia Petroleum Co. continues to test its new discovery, the 1 Vitek, wildcat discovery well on the West Flank of the San Felipe dome, Austin County. Through perforations at 8,073-81 ft. the well flowed 94.5 bbl. of 30°-gravity oil daily through a 1/4-in. choke. Test is located in the S. F. Austin Survey, Abstract 7.

W. R. Quin et al of San Antonio has run a potential on the 1 Bessie Barber et al, wildcat 1½ mi. southeast of the Blanconia field, and 2 miles northeast of the South Blanconia field, Bee County. The well was drilled to a depth of 5,355 ft. with casing set at 5,346 ft. Through perforations from 5,249-55 ft., the well flowed 80 bbl. of 30°-gravity oil through 11/64-in. choke. Tubing pressure was 300 psi. and casing pressure was 700 psi. The new discovery is located in the James and William St. John Survey.

Activity is rapidly developing in the Orange area with completion of one well, another being brought in, rig going up for the third wildcat to be started and three wildcats and semiwildcats being drilled. The new well is in the Bessie Heights area of southwestern Orange County. It was completed by the Gas Condensate Co. at approximately 8,000 ft.; however, no production tests have been announced. Meanwhile, the Texas Gulf Production Co. is washing in the 1 Bancroft, ½ mile westward extension to the new Hartburg field. It is reported to have approximately 75 ft. of producing sand at around 7,600 ft.

Henderson Coquat has completed the 1 W. H. Herring, in Live Oak County, for a gas-condensate discovery. Through perforations at 6,910-18 ft., the well flowed 113,000,000 cu. ft. of gas per day on open flow. Total depth of the well is 6,934 ft.

**TEXAS GULF COAST (DISTRICTS 2 AND 3) SUCCESSFUL WILDCATS**

Bee County: New oil pool—W. R. Quin et al 1 Bessie Barber et al, James and William St. John Sur., 2 mi. NE of So. Blanconia field, top pay 5,249 ft., TD 5,255 ft., perf. 5,249-55 ft., IP 80 bbl. oil per day, 11/64-in. choke, 30° gravity, GOR 250, TP 300 psi., CP 700 psi.

Live Oak County: gas discovery—Henderson Coquat 1 W. H. Herring, Block 52, Simmons Subd., 3 mi. NE of Clayton field, John Buchanan Sur., 7 mi. S-SW of Three Rivers, TD 6,934 ft., perf. 6,910-18 ft., IP 113,000,000 cu. ft. gas, open flow, SIP 2,600 psi.

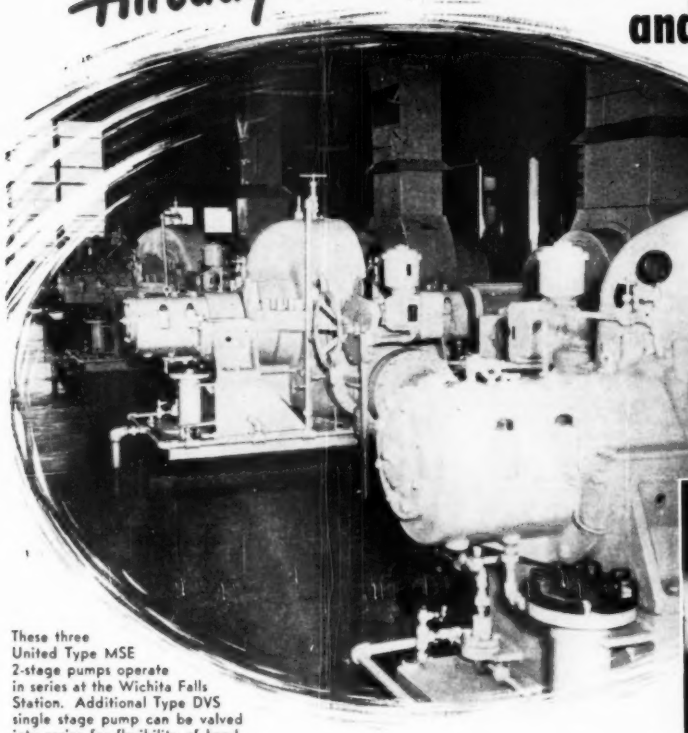
Victoria County: New pay at East Placedo—P. R. Rutherford, Heep Oil Corp. and Conroe Drilling Co. B-1 Mrs. Ben Shelton, Placedo Benavides Sur., ¾ mi. S of production, top pay 7,420 ft., TD 7,796 ft., perf. 7,428-31 ft., IP 161 bbl. oil per day, 1/8-in. choke, GOR 962, TP 1,300 psi., CP 1,600 psi., 44.2° gravity.

**TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT FAILURES**

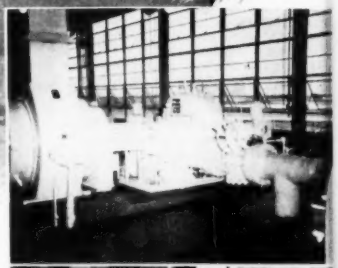
Bee County: Dirks Bros. 1 McGoldrick-Buchmann, Franklin Lewis Sur., 1 mi. NW of Caesar field, 7 mi. NW of Pettus, dry, TD 2,798 ft.

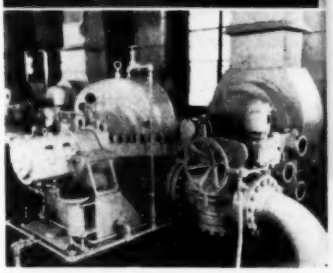
Lavaca County: Goodrich & Cocke 1 John

# *Already at Work* on the Basin and Ozark Systems



These three United Type MSE 2-stage pumps operate in series at the Wichita Falls Station. Additional Type DVS single stage pump can be valved into series for flexibility of head.





Upper Right: Typical United installation shows one of the United pumps on the Basin System.

Lower Right: Rated for peak efficiency at 1750 rpm, these United pumps are designed for dependable service with minimum maintenance.

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F. Bass, F. Houseman Sur. A-224, 2 mi. SW of Vienna, dry, TD 3,500 ft.

Victoria County: Kirkwood & Co. et al 1 J. E. Stubbs Estate, Rafael Manchola Gr., 2½ mi. S of Victoria, 1½ mi. S of Victoria field, dry, TD 5,230 ft.

Liebman & Gibson Drilling Co. 1 Rose Musselman, IRR Sur. 47, 4 mi. E-NE of Welder Ranch field, 13 mi. N-NE of Victoria, dry, TD 4,404 ft.

# OKLAHOMA

## Elk City Field Extended Another Mile Westward

ANOTHER major extension of the already widespread Elk City field in Beckham and Wichita counties is assured by a successful drill-stem test in Shell Oil Co. 1 Ada Smith, C NE SW 7-10n-21w. Location is a mile west of the most westerly well of the field. The test, the first for the well, took in an interval at 9,700-68 ft. Tool was open 61 minutes, and with $^{3}/_{8}$-in. choke on bottom and ½-in. choke on top, the 1,700-ft. water blanket was unloaded in 15 minutes. This was followed with a good gas blow, and a few minutes later condensate started to flow. During the last 38 minutes of the test, the well flowed 36 bbl. of condensate and 129,000 cu. ft. of gas. Following the test, 420 ft. of condensate was recovered. Hole was drilled to 9,910 ft., from which depth operators at latest report were running electric log.

A new shallow producing area is being opened 10 miles west of Hobart, in Kiowa County, southwestern Oklahoma, where C. C. Hudspeth 1 Annis, SW SE SW 26-7n-20w, is pumping and flowing 40 bbl. of 35.5° oil per day from Pontotoc conglomerate at 995-1,003 ft. with open hole from 994 ft. On one gage, the well made 5 bbl. per hour for 5 hours. Hole was drilled with rotary to 975 ft., and then completed with cable tools. Nearest production is 12 miles to the northwest. Several shallow gas wells, now abandoned, have been drilled in an area about a mile to the west.

Warren Wright and Mohawk Drilling Co. have a new Simpson dolomite pool in the making at their 1 Mallory, NW NW NW 30-17n-5e, located north of the old Agra pool, in northern Lincoln County, 5 miles south of Cushing. In a drill-stem test at 4,188-4,200 ft. in this section, the well showed gas within 7 minutes after the tester was opened, and following the test, lasting 90 minutes, approximately 75 ft. of oil and gas-cut mud was recovered. No indication of water was given. Hole was drilled to 4,250 ft. in Wilcox, topped at 4,245 ft., where casing has been run. Casing will be perforated in the dolomite, in which 20 ft. of objective pay was logged.

### OKLAHOMA SUCCESSFUL WILDCATS

Grant County: Anderson-Prichard 1 Hamburg, NE NE SE 21-26n-3w, pumped 12 bbl. of oil per day from Mississippi lime at 4,850-4,905 ft., TD 5,427 ft.

McClain County: Sinclair Oil & Gas Co. 1 Williams, C NW SW 18-5n-2w, 55 bbl. of oil per day from bromide sand at 8,368-87 ft., TD 9,459 ft.

Okfuskee County: Manhart 1 Palmer, SE SE SW 27-10n-9e, 7,500,000 cu. ft. of gas from Cromwell sand, TD 3,343 ft.

Mid-Continent 1 Fleming, SW SE NE 9-11n-11e, pumped 50 bbl. of oil per day from Wilcox at 3,694-3,708 ft., TD

Pittsburg County: Intex Oil Co. 1 Dupitch, SE NE SE 35-6n-15e, 500,000 cu. ft. of gas from sand at 844-95 ft., TD 1,795 ft., extension to new pool.

Pottawatomie County: Gulf Coast Western 1 Rose, NE SW SW 10-10n-4e, pumped 45 bbl. of 34.6°-gravity oil per day from Wilcox, TD 5,527 ft.

### OKLAHOMA WILDCAT FAILURES

Creek County: Bates & Springer 1 Bishop, NE SW SW 12-15n-8e, dry, TD 3,805 ft.

Garfield County: Oliphant 1 Bordman, SE SE NE 9-23n-5w, dry, TD 6,611 ft.

Hughes County: G. W. Deck 1 Turner, NE NE SW 29-8n-10e, dry, TD 3,510 ft.

Kay County: Thrifty Drilling 1 Byers, NE NW SW 3-27n-3e, dry, TD 3,170 ft.

Lincoln County: Murphy Oil Co. 1 Wofford, SW SW SE 22-14n-4e, dry, TD 4,230 ft.

J. S. & T. 1 Paula, SW SW SE 17-16n-3w, dry, TD 5,818 ft.

Okfuskee County: Wilcox 1 Deere, SW SW SW 1-12n-9e, dry, TD 3,245 ft.

Mid-Continent 1 Stormout, NE SW SW 23-12n-10e, dry, TD 3,490 ft.

Pawnee County: Sanders Oil Co. 1 Hoover, NE NE SE 23-21n-6e, dry, TD 3,004 ft.

Sanders Oil Co. 1 Owen, SE SE SE 25-21n-6e, dry, TD 2,843 ft.

Seminole County: Frank B. Murta 1 West, NW NW NE 10-6n-7e, dry, TD 4,430 ft.

# PERMIAN BASIN

## Scurry County Wildcat Drilling Below 7,713 Ft.

MIDLAND.—Honolulu Oil Corp. 1 Brown, Scurry County wildcat in SW SW 65-3-H&GN, which was taken over from Burdell Oil Co. at 7,500 ft., was drilling ahead below 7,713 ft. An unidentifded dolomite was topped at 7,713 ft., and a 40-minute drill-stem test from 7,705-44 ft. recovered 250 ft. of gas-cut mud. Operators ran electrical surveys after the test. Location is 1 mile east of the town of Dunn, and some 12 miles southeast of Kelley Canyon production.

Burdell Oil Co. 1 Eula Bert Keller, 340-97-H&TC, 1½ miles west of production in the south part of the North Snyder field, topped the reef at 6,859 ft., on elevation of 2,426 ft., and logged good odor of oil and fluorescence in samples. Operators were running electrical surveys to 6,870 ft., total depth.

Gene Goff et al 1 Joe Rylander, 124-3-H&GN, 5½ miles south of Sunray 1 Sentell, Strawn discovery, and about 1 mile northeast of Snyder, topped the Strawn at 7,174 ft., minus 4,770 ft., said to be about 125 ft. high to the 1 Sentell. A 2½-hour drill-stem test in lime from 7,175-97 ft. produced a good blow at the start, had gas in 5½ minutes which continued throughout the test. When the tool was closed and packer loosened, the well headed oil and flowed for 2 hours and 40 minutes at the rate of 30 bbl. an hour. At last report operators were recementing before making further tests. Five-inch casing was set at 7,170 ft.

Davis & Miles 1-A John J. Schattel, 90-2-H&TC, 8 miles northwest of Baxter's 1 Feldman, set 5½-in. casing at 7,781 ft., after topping the Ellenburger at 7,750 ft., on elevation of 2,459 ft. Swabbing on perforations at 7,736-80 ft. produced 90 per cent salt water, and operators made new holes from 7,736-65 ft., washed with 500 gal. of mud acid and swabbed 3 bbl. of oil an hour. A second treatment of 1,000 gal. increased the oil yield to 5 bbl. an hour. Pumping equipment was being moved in.

J. A. Chapman Producing Co. 1 D. M. Cogdell, 467 ft. from south and west lines, 716-97-H&TC, Kent County Canyon reef discovery, completed for a flowing potential of 595½ bbl. of 41.7°-gravity oil a day, through ½-in. choke from perforations at 6,841-47 ft. There was no formation water. Gas-oil ratio was 534 cu. ft. The section had been treated with 500 gal. of mud acid before the test. Tubing pressure was 115 psi.

Two miles southeast of Polar, Drilling & Exploration Co. 1 Wilson Connell, 19-5-H&GN, ran a drill-stem test in the Strawn at 7,131-46 ft., with tool open 1½ hours. The test had a light blow throughout and recovered 30 ft. of gas-cut mud, 205 ft. of oil and gas-cut mud, and 72 ft. of muddy salt water. Gas kicked fluid out of the drill pipe while the tool was being broken down.

A drill-stem test at 7,367-80 ft., identified as lower Strawn, had gas in 83 minutes, and recovered 1,400 ft. of slightly oil and gas-cut salty drilling mud, plus 50 ft. of gas-cut salt water. It was drilling ahead at 7,392 ft.

In the Susan Peak field of Tom Green County, a reworked outpost to the main Strawn production had prospects of good commercial production from a deeper lime strata. The well is J. Ralph Stewart and T. W. Murray 1 J. Wiley Green, SW NW SW 184-11-SPRR, which failed to produce from an upper Strawn lime in drilling to 4,747 ft., where production was had in the J. K. Wadley 1 Green, one location to the south, and which at the time was a 1-mile northeast stepout to the field.

At last report, operators had 1 ft. of pay at 4,766 ft., and were to deepen 2 ft. and make completion attempt. Barren lime was logged from 4,747-50 ft., shale to 4,761 ft., then lime from 4,761-65 ft. which was hard, dense and barren, but the next 1 ft. was porous and oil bearing. Oil filled the hole in 90 minutes and flowed to top of the mast early this week. Gas with the oil was estimated at 2,000,000 cu. ft. daily.

Reports on other Susan Peak outposts included the following: Hiawatha Oil Co. 2 W. G. Currie, east offset to the 1 Currie, south extension discovery, was drilling shale at 4,505 ft.

M. E. Davis and Hiawatha 2 Robert C. Jones, 2½ miles west of the field, was drilling lime and shale at 2,157 ft.

C. L. Norsworthy, Jr., 1 W. C. Jones, wildcat in 38-24-H&TC, acidized through perforations at 5,523-30 ft., swabbed water, and prepared to squeeze.

Two miles northeast of Wall, Sun Oil Co. 1 F. A. Braden was below 2,010 ft. in shale.

### WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT DISCOVERIES

Borden County: Amerada Petroleum Corp. 1 N. C. Von Roeder, 103-25-H&TC, TD 7,556 ft., PB 7,183 ft., elevation 2,368 ft., top Canyon reef 6,835 ft., perforated 40 shots 7,100-10 ft., acidized 500 gal., IP flowed 185.4 bbl. 38.8°-gravity oil, plus 32 bbl. water, 24/64-in. choke, GOR 885 cu. ft.

Scurry County: C. L. Norsworthy, Jr., R. W Baxter, Standard-Fryer Drilling Co. and Ted Weiner 1 D. D. Feldman, NE NE 63-3-H&TC, 11 mi. E Snyder, TD 7,362 ft., elevation 2,257 ft., top Ellenburger pay 7,310 ft., IP pumped 121.4 bbl. 42°-gravity oil a day, no water, perforations 7,309-35 ft.; Canyon reef, 5,980 ft., Strawn 6,880 ft., Mississippian 7,208 ft., top not reported on Ellenburger.

### WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT FAILURES

Coke County: C. H. Murphy 1 R. C. Russell, SE SE 377-1A-H&TC, 4 mi. NW Robert Lee, TD 6,729 ft., elevation 2,062 ft., Valera 2,555 ft., Flippen 3,810 ft., Permian base 4,165 ft., Ellenburger top 6,665 ft., tentative.

Crockett County: L. W. Glasco 1 Mrs. Clara Couch, SE NE 15-ST-GC&SF, 7 mi. W Ozona, dry, TD 9,368 ft., elevation 2,479 ft., San Andres 1,230 ft., Strawn 7,905 ft., Ellenburger 9,001 ft.

Dawson County: R. J. Caraway 1 T. A. Loe, NW NW Labor 12, League 3, Munger Subdivision, Taylor CSL, 9 mi. NW Lamesa, dry, TD 10,005 ft., PB 8,807 ft., elevation 3,051 ft., Sprayberry sand 7,357 ft., Dean sand 8,405 ft., Reef lime 8,573 ft., dark lime 9,294 ft., Sprayberry had show of gas.

Howard County: Moore Exploration Co. 1 Mildred Jones, SE NE 36-33-T3N-T&P, 2 mi. SW Vealmoore field, dry, TD 8,420 ft., elevation 2,761 ft., Canyon lime 8,391 ft.

Irion County: Moore Exploration Co. 1 Abe Mayer estate, 49-10-SPRR, 11 mi. NE Mertzon, dry, TD 6,783 ft. in shale, elevation 2,197 ft., no shows or tests reported.

Morgan-Aikman & Co. 1 Sol Mayer, SE SE Sec. 37, WCRR Sur., SW corner of county, dry, TD 8,916 ft., elevation 2,541 ft., Sprayberry sand 5,820 ft., Ellenburger 8,720 ft.

Runnels County: A. G. Hill 1 C. E. Dank-

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worth, J. G. Wagner Sur. 424, 2 mi. S Ballinger, dry, TD 4,367 ft., Ellenburger 4,272 ft.

Upton County: Superior Oil Co. 2 J. W. Robbins, NW NE 4-W-GC&SF, 9 mi. SE McCamey field, dry, TD 9,287 ft., elevation 2,594 ft., Devonian 7,015 ft., Silurian shale 7,686 ft., Fusselman 7,765 ft., Montoya 7,870 ft., Simpson 7,950 ft., Ellenburger 8,740 ft., lower Ellenburger 9,215 ft.

### SOUTHEAST NEW MEXICO SUCCESSFUL WILDCAT

Eddy County: Kersey & Co. 1 Dunn, SE NW 12-18s-28e, 2 mi. NW extension to Loco Hills field, TD 2,650 ft., elev. 3,622 ft., pay 2,340-60 ft., IP flowed 360 bbl., 36 -gravity oil a day, top Grayburg 2,246 ft.

### SOUTHEAST NEW MEXICO WILDCAT FAILURES

Eddy County: Grant Kays 1 State, SW NW SW 23-19s-27e, dry, TD 1,732 ft., elev. 3,470 ft., Yates 290 ft., Gray lime 722 ft.

Lea County: Cox & Hamon 1 State, NW NW SW 19-20s-35e, dry, TD 3,520 ft., elev. 3,676 ft., anhydrite 1,665 ft., salt 1,907-3,470 ft.

## ROCKY MOUNTAIN

### Sage Spring Creek Field Is Extended 2 Miles Southward

DENVER—At a 2-mile south extension to Sage Spring Creek field, Natrona County, Wyoming, Amerada Petroleum Corp.'s well filled 4,615 ft. of 36.2 -gravity oil on 2-hour drill-stem test and is considered of importance in future developments in this area. The well is the 4 Unit, CS½ NW NE 7-36n-77w, and the test was made of Dakota sand between 7,488-7,524 ft. In addition to the oil the well made 545 ft. of mud-cut oil and 478 ft. of oil-cut mud on the test. Flowing pressure was 1,700 psi, and shut-in pressure 2,500 psi.

The operator has run casing for completion of the well. Amerada made a small Dakota discovery on this structure last year, with the well completed pumping 135 bbl. of 34.7 -gravity oil daily from that formation. This well was drilled into Madison prior to plugging back for completion. The company completed two additional wells in the Sage Spring Creek area proper prior to drilling the present extension. The 4 Unit is approximately 400 ft. lower structurally than the discovery well, but sand condition is believed responsible for the improved test. It is also possible that faulting may be partially responsible for accumulation in this particular area.

After testing Mesa Verde sands Stanolind Oil & Gas Co. plugged its wildcat in the North Alkali Butte area, Fremont County, Wyoming. The well is the 1 Shoshone-Arapahoe-Tribal "C," SW SW SE 1-1s-5e (WRM), and was drilled to 6,418 ft., total depth. The wildcat is on Indian lands bid in by Stanolind for $68,482 last summer, and was located following seismic work in the area. No shows were reported for the wildcat, and the only drill-stem test made was between 5,055-77 ft., with the recovery only 180 ft. of water in 45 minutes. The well is north of the Alkali Butte field and northeast of the Riverton area, where production is from Tensleep sand at depths below 10,000 ft.

Two new failures for northeastern Colorado are in prospect, with failures in Dakota at Carter Oil Co. and E. K. Carey Drilling Co. et al wildcats. Carter's 1 Blanchard, CSE NE 11-6n-53w, in the Fort Morgan area, Morgan County, is below 5,178 ft. after topping Muddy at 5,124 ft. Cores in Muddy showed fine white sand with no staining. Republic Natural Gas Co., Plains Exploration Co., and Bay Petroleum Corp. joined Carey in the Iliff area test at 1 Conklin, CNW SW 23-10n-51w, Logan County, and this well found Muddy hard and tight and no commercial shows in Muddy or Dakota sand. During the past 6 months, following discovery of oil in the Gurley area, Cheyenne County, Nebraska, there have been more than six Dakota sand failures in northeastern Colorado, but additional wells are planned for the area, following seismic work by several operators.

### WYOMING WILDCAT FAILURES

North Alkali Butte, Fremont County: Stan-

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olind Oil & Gas Co. 1 Shoshone-Arapahoe-Tribal "C," SW SW SE 1-1s-5e, TD 6,418 ft., dry, Ft. Union 1,365 ft., Lance 3,320 ft., Mesa Verde 4,480 ft., Cody 5,725 ft.

West Alcova, Natrona County: West Alcova Oil Co. 1 Govt., NW SW NE 15-30n-84w, TD 1,028 ft., dry.

### COLORADO WILDCAT FAILURE

Loveland area, Larimer County: C. S. Lavington 2 Trindle, C SE¼ 30-5n-68w, TD 1,811 ft., dry, basal Hygiene 1,787 ft. with show of gas.

## CALIFORNIA

### Humble Is Conditioning Its 2 Newhall Land Well

LOS ANGELES.—The 1 Newhall Land & Farming well of Humble Oil & Refining Co. is being completed in the zones originally found productive. Additional drilling located another sand below 11,839 ft. but it was coarse and silty. Testing resulted in recovery of 480 ft. of drilling mud and water. Test is now plugged from bottom at 11,952 ft. to 11,840 ft. Production is expected from the interval between 11,638-11,775 ft. for gas and from 11,775 to 11,839 ft. for oil. Test of the oil interval has already shown 210 bbl. in 23 hours, 29.3 gravity.

This well proves an undetermined acreage about 1 mile north of the Newhall-Potrero field and 1¼ miles southeast of the Del Valle field. It also brings in production from an interval as yet untested in adjoining areas.

In the Del Valle area, 16-4n-17w, the Camay Drilling Co. in a joint venture with Fred Goodstein of Casper, Wyo., have spudded 1 Socalpete-Kinler. The location is just north of the Del Valle field and may be an attempt to locate the sands found by Humble in its 1 Newhall Land & Farming well.

In the extreme southeast Cuyama Valley, C. W. Colgrove has abandoned 54-18 Wright in the Ozena area of Ventura County, 18-7n-23w. On test the try swabbed gassy, muddy water. A second test is now planned at 12-7n-24w to be known as 64-12 Reyes.

Richfield also abandoned a southeast Cuyama try. The 1 Round Springs Unit in 32-8n-23w was found dry at a total depth of 4,010 ft.

In the same area the Richfield 1 Apache Unit near Packwood, 22-8n-24w, has become the deepest hole in the Cuyama Valley. It has passed 8,250 ft. and is drilling ahead.

Natural Gas Corp. of California has given the Trico gas field in Kings County a slight extension to the west. Their well, 2 Heath, 13-24s-22e, produced 6,090,000 cu. ft. of gas at 950 psi. The well has been shut in. Producing interval is 2,455-82 ft, and the depth is 2,600 ft.

The Enterprise Oil Co. has brought a Reserve sand well in the Tejon area, 34-11n-19w. The well was completed at 4,631 ft. with gun perforations at 3,970-4,005 and 3,922-3,953 ft. After cleaning out sand the well pumped 125 bbl. per day.

Richfield has also brought in a reserve zone well, 55-R-34 Tejon B, as a north offset to the Bright discovery well. The well, bottomed at 4,646 ft., is plugged back and flowing 170 bbl. per day from an interval above 4,110 ft.

### CALIFORNIA SUCCESSFUL WILDCATS

Kern County, Arvin area: Joseph F. Zottarelli 1 C & T, 1-31s-29e, pumping 10 bbl. of 24 -gravity oil, TD 2,541 ft., elev. 572 ft., Temblor pay.

Los Angeles County, Newhall-Placerita area:

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Independent Exploration Co. and Rothschild Oil Co. 1 Phillips, 6-3n-15w, pumping 20 bbl. of 13.5°-gravity oil, two new producing zones, 592-692 ft. and 800-981 ft., TD 981 ft.

**CALIFORNIA WILDCAT FAILURES**

Kern County, Edison area: Golden Bear Oil Co. 45-10 Grayson, 10-32s-29e, dry. Transition zone 2,279 ft., Freeman silt 4,202 ft., Jewett 4,805 ft., granite 5,230 ft., TD 5,258 ft., elev. 600 ft.

Mountain View area: Western Gulf Oil Co. 44-36 DiGiorgio, 36-30s-29e, dry, granite 2,093 ft., TD 2,110 ft., elev. 585 ft.

Monterey County, San Miguel area: Chanslor-Canfield Midway Oil Co. 1 Mahoney, dry, 3-25s-12e, TD 4,772 ft., elev. 1,600 ft.

# EASTERN TEXAS

## Hollandsworth Starting to Swab at Schenewerk

DALLAS.—Hollandsworth Oil Co. 1 George A. Schenewerk, Woodbine wildcat 5 miles southeast of Pine Mills in Wood County, started swabbing operations in an effort to flow the well. At this report, the well had been swabbed for 24 hours and it was expected to flow. No estimate had been made on the amount of recovery. Operators said the oil level remained about 700 ft. from the surface.

Total depth of the well was 5,627 ft., with 5½-in. casing set on bottom and perforated from 5,475-90 ft. Following perforation, the well flowed at the rate of 4 bbl. of oil an hour through 13-64-in. choke, and when it had cleaned itself, swabbing was started. Location is in the William Fisher Survey, and about 1½ miles south of the Pine Mills field.

F. R. Jackson was to stake an offset location to the Hollandsworth well, on the south 100 acres of the Fouke Estate tract, of the Watkins Survey.

Tide Water Associated Oil Co. and Seaboard Oil Co. of Delaware 1 C. K. Wade, deep test in the John H. Field Survey, 1 mile north of Kelsey in Upshur County, started coring for the Smackover. The first core pulled, from 11,336-351 ft., recovered 1 ft., having light gas odor on fresh break. It was coring ahead below 11,351 ft.

In Robertson County, F. M. Morrison and George Jordan have temporarily shut down at their 1 A. C. Ellis, S. W. Hill Survey, 7 miles east of Franklin. Total depth of the wildcat was 5,165 ft., in the Woodbine. According to reports, it is expected to be carried to the Edwards lime in the near future. Electrical surveys indicated some possibilities of production from the Woodbine.

**EAST TEXAS (DISTRICTS 5, 6, AND 6-P) SUCCESSFUL WILDCAT**

Navarro County: Ted Weiner et al 1 W. G. Holleman, R. D. Newman Sur., 6 mi. E Bazette, TD 3,287 ft., elev. 372 ft., PB 3,240 ft., perf. 3,220-26, 3,231-37, IP flowed 12,500,000 cu. ft. gas a day, open flow, TP 1,168 psi., shut in for connection.

**EAST TEXAS (DISTRICTS 5, 6, AND 6-P) WILDCAT FAILURES**

Houston County: S. M. Aronson 1 Louis Story, Stephen Rogers Sur., 2½ mi. NE Grapeland, dry, TD 6,010 ft., elev. 447 ft., Pecan 4,610 ft., Austin 5,685 ft., Woodbine 5,970 ft., by samples.

Wood County: A. O. Phillips 1 A. A. King, English Sur., NW edge of Mineola, dry, TD 6,130 ft.

# SOUTH LOUISIANA

## Humble's Iberia Parish Shows Gas on Test

NEW ORLEANS.—On a 9-hour test, Humble Oil & Refining Co. reported a flow of 547,000 cu. ft. of gas and 36 bbl. of condensate per day through a ¼-in. choke at the 1 State Lease 1706-West Cote Blanch Bay, Iberia Parish wildcat. The well was drilled to a total depth of 13,693 ft. and plugged back to 10,020 ft. for testing. Exact depth of the perforations has not been reported. The well is now shut in until tanks can be installed.

An important discovery in Plaquemines Parish has developed with oil and gas shows indicated by electric log reported for the California Co. 1 North Main Pass Unit, 22-20s-19e. The shows as indicated by log were: oil at 6,435 ft., gas at 7,705 ft., gas at 8,688 ft., oil at 8,978 ft. and oil at 9,025 ft. Hole is bottomed at 9,200 ft. The test is not considered to be an extension of the Grand Bay field since considerable faulting separates the two locations.

Approximately 8 miles east of Longville, Magnolia Petroleum Co. tested a flow of 30 per cent oil and 70 per cent salt water in an initial test on the 1 Ragley Lumber Co., 20-5s-7w, Beauregard Parish. The casing was perforated at 8,876-80 ft.; however, trouble developed immediately when operators dropped tubing in the hole and several days are expected to pass before testing can be continued.

Magnolia continues to test its St. Mary Parish wildcat, the B-1 State Lease 843, in the Eugene Island area. On last drillstem test from perforations at 11,359-61 ft., operators reported a flow of salt water and spray distillate after opening for 20 hours.

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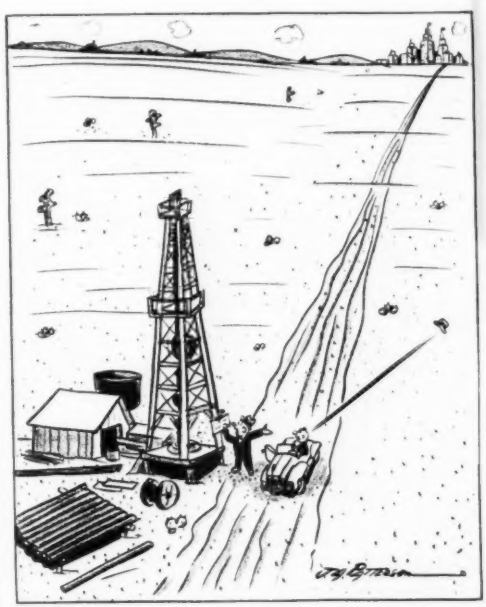



*"It's a note that says, 'Gone to lunch. Be back in 15 minutes.'"*

Recovery was 9,100 ft. of salt water and 120 ft. of distillate cut with mud and 25 ft. of sand. Hole is bottomed at 14,048 ft.

Off Terrebonne Parish, Magnolia is testing lower sands in the Block 58 wildcat, B-1 State Lease 673. Perforations were made at 11,206-11 ft.; however, no results of the testing have been reported as yet.

# MICHIGAN

## New Discovery Ends Operations for 1949

MOUNT PLEASANT—Superior Oil Co. 1 Kenyon, NE NW SW 12-20n-1w, Butman Township, deeper horizon wildcat, Gladwin County, swabbed and flowed 140 bbl. of net oil from the Richfield zone in 16 hours after reacidization with 8,000 gal. The test, located just a short half mile north of the lone discovery producer in Butman Dundee field, was heralded as possibly the most important Richfield discovery for 1949.

With hole bottomed out at 5,027 ft., in black lime (below the known Richfield), and 7-in. casing cemented at 5,011 ft. with 500 sacks, potential pays in and above the Richfield were jet-perforated with a total of 156 shots between 4,874-4,971 ft. The best pay was reported at 4,920-30 ft. The Richfield horizon was first acidized with 2,000 gal. with inverted tubing packer set at 4,902 ft., but packer failed allowing salt water from upper perforations to channel into the pay.

For the 8,000-gal. treatment, tubing packer was set at 4,838 ft. and when swab-flow tests were made following acid shot, there were 400 psi. on the tubing.

This new find was estimated good for 100 bbl. a day on the basis of early production tests. No water was showing with the oil.

The State Supervisor of Wells issued a 21-day emergency order establishing 40-acre spacing in this area until a public hearing and firm order can be issued. According to this spacing rule, permits will be written for the northeast 10-acre spot on each square governmental 40-acre unit. Bulk of the acreage around the new producer is owned by Superior Oil Co. and H. E. Bell et al., discoverer of the field.

### MICHIGAN SUCCESSFUL WILDCATS

Allegan County, Lee Township: Ford Oil Co. 1 Kaminski, SE SE SE 6-1n-15w, Traverse 1,130 ft., 7 bbl., TD 1,134 ft.

Watson Township: Lowell Bernhardt 1 Swanty & Peterson, NE SE NE 30-2n-12w, Traverse 1,465 ft., 30 bbl., TD 1,468 ft.

Gladwin County, Butman Township: Superior Oil Co. 1 Kenyon, NE NW SW 12-20n-1w, 100 bbl. from Richfield at 4,920-30 ft., TD 5,027 ft.

Oceana County, Benona Township, Mercer Oil Co. 1 Brazee, NW SW NW 13-14n-18w, Traverse pay 1,670-73 ft., 40 bbl., TD 2,276 ft.

### MICHIGAN WILDCAT FAILURES

Allegan County, Cheshire Township: Chester Anderson 1 Central Camping Asso., Inc., NW SW SW 12-1n-14w, Traverse 1,350 ft., dry, TD 1,400 ft.

Hopkins Township: Cook Drilling Co. 1 Bellgraph, SW NW SW 6-3n-12w, dry in Coldwater red rock, TD 993 ft.

Lee Township: Norman L. Stevens 1 Schuler & Hayes Comm., SE NW NE 29-1n-15w, Traverse 1,184 ft., dry, TD 1,193 ft.

Watson Township: Chester Anderson 1 Selby & Sirrine, SE SW NE 21-2n-12w, Traverse 1,558 ft., dry, TD 1,598 ft.

Barry County, Irving Township: C. W. Collin 1 Kidder, NE SE SE 9-4n-9w, Dundee 2,236 ft., dry, TD 2,356 ft.

Bay County, Pinconning Township: Smith Petroleum Co. 1 Pieper-Beadore Comm., NE NE SE 29-17n-4e, Traverse 2,078 ft., dry, TD 2,251 ft.

Saginaw County, Lakefield Township: Robert Bond and C. W. Collin 1 Stark, NE NE NW 1-11n-1e, Dundee 3,169 ft., dry, TD 3,227 ft.

Van Buren County, Pine Grove Township: E. W. Leeder 1 Irwin-Dadrich Comm., SE NE SW 19-1s-13w, Traverse 1,349 ft., dry, TD 1,352 ft.

# OHIO, KENTUCKY

## Wiser Adds Another Gasser To Bethlehem Township

COLUMBUS.—Wiser Oil Co. added another good gas well to the Bethlehem Township, Stark County, pool. The 1 Phil D. Keller, Section 14, logged the White Clinton at 4,505-33 ft. and gaged 1,360,000 cu. ft. natural with a rock pressure of 1,260 lb.

William Larrick et al have apparently found a new oil pool in Jackson Township, Knox County, 1 mile south of the east end of the Bladensburg pool. On Ray E. Earlywine in Section 12, the well topped the Clinton sand at 3,077 ft., and made a good showing of oil natural. No report on the results of the shot have been received as yet. Approximately 12 rigs are currently running in this township.

H. A. Baughman 1 fee, Lot 24, Henrietta Township, Lorain County, a wildcat, was shot with 90 qt. in the Newburg sand and in 1 hour gaged 200,000 cu. ft. of gas and filled 100 ft. with oil.

William Schott et al extended the Berea sand gas pool in the south part of Enoch Township, Noble County, ½ mile to the east. Sand at 1,621-38 ft. made 150,000 cu. ft. natural and 350,000 cu. ft. when shut in after shot. Rock pressure was 745 lb.

Out of a total of 17 new locations for the week, 4 were in Knox County, 2 in Ashland, and 2 in Perry. Wells completed totaled 19, with Stewart field having 5, and Ashland 4.

### WESTERN KENTUCKY

OWENSBORO—R. H. Compton 1 Sampley, NE¼ 17-P-28, a southeast extension of the Stanley area, in Daviess County, has been completed as a 20-bbl. pumper in Jackson sand at 1,498-1,514 ft. Pay was shot with 50 quarts of nitro.

Cherry-Kidd 1 Wilson, C S½ 8-O-22, which opens a new area northwest of Dixie and south of Corydon, in southwestern Henderson County, is showing improvement in production. Still testing Cypress sand at 2,188-92 ft., it was swabbing at the rate of 175 bbl. of oil per day at latest report. It previously was reported swabbing 2 bbl. per hour while cleaning out.

### WESTERN KENTUCKY SUCCESSFUL WILDCAT

Daviess County: R. Hal Compton 1 Sampley, SW NW NE 17-P-28, IP 20 bbl., Jackson 1,508-11 ft., TD 1,514 ft.

### EASTERN KENTUCKY

ASHLAND—First well to be completed in the old Ashland gas field in many years is that of Kentucky & Ohio Gas Co. 4 Division in Gartin subdivision, in the City of Ashland. After shot well gaged 286,000 cu. ft. of gas daily from the Devonian brown shale from 1,495 ft. to 2,092 ft., total depth.

One mile north of Prestonsburg, Ky., and on the Big Sandy River in Floyd County, Penn Fitzpatrick et al have recently completed Cynthia Porter 1 for 92,000 cu. ft. of gas daily from Devonian brown shale from 1,435 to 1,968 ft., total depth. Gas is to be used for the town of Prestonsburg.

In western Lewis County, 4-Y-72, H. P. Purnell et al are shut down for orders at 1,545 ft. at 1 C. F. Ferguson, 1½ miles northeast of the town of Tollesboro. Approximately a hole full of water was had at total depth and still in base of Highbridge (Ordovician series).

### INDIANA

EVANSVILLE.—In an attempt to explore the oil and gas potentialities of its fee properties in the area 6 miles northeast of Washington, in Daviess County, Tecumseh Coal Co. uncovered what may prove to be another new pool for the district. Its first test, 1 Fee, SE SE NW 16-3n-6w, drilled to a total depth of approximately 1,250 ft. with bottom in Salem lime, swabbed at a reported rate of 1½ bbl. of oil per hour while cleaning out and testing following a 500-gal. acid treatment.

Two additional tests, 2 Fee, NW SE NW 16, a location northwest of the first well, and 3 Fee, SE NE NW 16, a location northeast of No. 2, already have reached the discovery well's pay zone, and have casing run preparatory to testing. A fourth test, a location northwest of No. 2, is drilling.

The discovery is several miles to the west of the old Loogootee gas area and about 6 miles north of the North Glendale pool, nearest other oil production.

A new productive spot located just west of the north end of the Keensburg Consolidated pool, in Wabash County, also is indicated at C. E. Skiles 1 Schmidt, located 1,515 ft. east and 990 ft. north from the SW cor. 18-2s-13w, where 840 ft. of clean oil and 90 ft. of oil-cut mud was recovered in a drill-stem test of O'Hara lime at 2,816-21 ft. Hole is being drilled ahead for a look at lower potentially productive zones.

Carl Miles 1 Crane, NE SW SW 4-3n-4w, a wildcat located 3½ miles northeast of Loogootee, in Martin County, flowed at the rate of 1,750,000 cu. ft. of gas daily at completion in Chatt shale at 1,495-1,520 ft. Rock pressure was 780 psi.

### INDIANA SUCCESSFUL WILDCAT

Martin County: M & M Drilling Co. 1 Crane, C SW SW 4-3n-4w, IP 2,000,000 cu. ft. gas, Chattanooga shale 1,478-1,512 ft., TD 1,512 ft.

### INDIANA WILDCAT FAILURES

Clay County: Carter Oil Co. 1 Archer, NW SW SW 3-13n-7w, dry, TD 1,912 ft.

Sullivan County: F. B. Cline 1 Deaton, NE NW SW 26-9n-10w, dry, TD 1,546 ft.

Vanderburgh County: Dean Shendall 1 Nurrenburn, NW NW NW 3-8s-11w, dry, TD 1,683 ft.

# CANADIAN FIELDS

## Gas Discovery Is Reported In Southeast Alberta

CALGARY—The first natural-gas discovery of 1950 was recorded by the team of Hudson's Bay Oil & Gas Co. and Sparky Oils, Ltd., in the Bow Island sand near the town of Oyen, in Southeast Alberta. The Oyen wildcat is Sparky's first venture since Ohio Oil Co., recent American entry into Canada's oil and gas exploration and development program, purchased controlling interest in Sparky Oils, Ltd.

The well, Hudson's Bay-Sparky 1, LSD 4, 12-29-5w4, is located about 9 miles northwest of Oyen and 140 miles east and 25 miles north of Calgary. Hole was drilled to 4,046 ft., and plugged back for test of gas potential. The Bow Island gas sand interval 2,588 to 2,613 ft. was perforated after casing was set, and testing commenced. During test the well rated a dry natural-gas flow rate of 6,000,000 cu. ft. daily. Crew is now tearing out rotary tools and plan to run further test when rig has been removed.

Golden Spike, Alberta's richest D3 Devonian oil discovery (in terms of oil recoverable per acre) has now provided the

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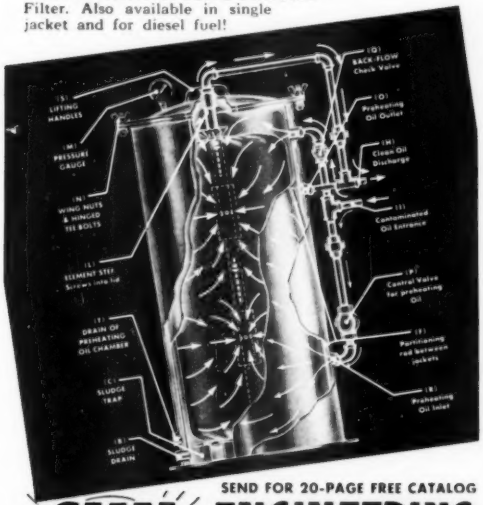
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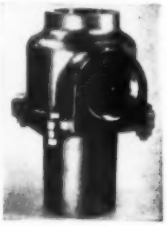

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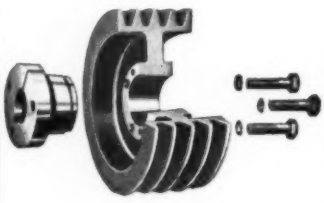

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first evidence of commercial oil in the D2 zone. Imperial Oil, Ltd., on drill-stem test of the D2 zone at Imperial-Golden Spike 5, got a flow of oil to the surface 14 minutes after tester was opened, accompanied by a substantial flow of natural gas with a maximum rate of 960,000 cu. ft. daily. The test was of interval 4,999 to 5,087 ft. The crew has since run a 36-minute test from 5,057-87 ft. and the well flowed oil in 16 minutes. Gas flow was 353,000 cu. ft. daily. When pipe was pulled, fluid recovery consisted of 1,050 ft. of oil and 50 ft. of drilling mud. Hole was drilled to 5,117 ft. and crew is now preparing to run further test.

Imperial Oil, Ltd., has staked and started rigging at another Northwest Alberta wildcat. The new venture, Imperial-Kathleen 1, LSD 5, 1-77-20w5, is situated about 40 miles southeast of Peace River town and about 200 miles northwest of Edmonton.

Imperial has moved its National 3 rig from the Normandville Devonian oil discovery, about 21 miles to the northwest, and crew is rigging up. The well will be a test of Devonian oil and gas possibilities.

**CANADIAN WILDCAT FAILURE**

Whitemud, R. W. 1, LSD 11, 15-51-25w4, TD 4,110 ft.

# ILLINOIS

## New Producing Spot Found By Wayne County Wildcat

MATTOON.—Another producing spot appears to have been found by J. W. Everhart in his 1 Harrell, NE SE SE 35-2n-5e in the northeast corner of Wayne County. In a drill-stem test of McClosky lime at 2,954-60 ft. with bottom of hole at 2,961 ft., the well gave a recovery of 630 ft. of clean oil and 140 ft. of oil-cut mud without trace of water. Casing has been run to 2,950 ft. and cable tools are being moved in to complete. Location is about ¾ mile south of production in the Zenith pool, about 4 miles northeast of Orchardsville.

Alva C. Davis and Russell P. Johnson 1 Moore, NE NE SE 12-2n-10e, 2 miles south of Calhoun, Richland County, another new pool-opener as indicated in previously reported drill-stem tests, flowed 66 bbl. of clean oil through tubing in the first 2 hours of production tests, and looks like a good well. It is testing McClosky lime at 3,272-77 ft. with bottom still in the pay. No acid has been used. It is about 2½ miles from nearest production in the Parkersburg Consolidated pool.

Elk Oil Co. and White River Drilling Co. 1 Blazier, NW SW NW 16-7s-9e, west side of the Herald pool, White County, pumped 100 bbl. of oil per day at completion. Production is from Tar Springs sand at 2,353-62 ft. and Cypress sand at 2,656-67 ft. It is about 2½ miles from other production in these sands.

**ILLINOIS WILDCAT FAILURES**

Christian County: Ben Nation 1 Munson, NW NW NW 15-15n-3w, dry, TD 1,830 ft.

Clay County: Bell Brothers 1 Blair, SW NE SW 17-3n-8e, dry, TD 3,080 ft.

Fulk & Davis 1 Leonard, C E½ NE SE 29-5n-8e, dry, TD 3,107 ft.

Edgar County: Gopher Drilling Co. 1-A Wm. Roll, NE NE SE 18-14n-13w, dry, TD 852 ft.

W. C. Cook Drilling Co. 1 Wieland, SE SE SE 34-14n-14w, dry, TD 224 ft.

Slenaker & McClintock 1 Richey, SW SE NW 8-12n-13w, dry, TD 500 ft.

Effingham County: Calvert & Willis 1 Richars, SE SW NW 13-6n-6e, dry, TD 2,863 ft.

Lawrence County: Ryan & Sharp 1 Diver, SE SW SE 12-2n-12w, dry, TD 1,990 ft.

Macoupin County: Nash Redwine 1 Pound, SE SW NW 25-9n-6w, dry, TD 1,801 ft.

Marion County: W. Duncan 1 Hodges, SW SW NE 17-2n-4e, dry, TD 2,818 ft.

Montgomery County: Mazzarino et al 1 Blackburn, NE SW NE 8-7n-4w, dry, TD 913 ft.

## Eightieth Birthday

*(Continued from page 39)*

Of the total cash requirements of the business of $170,193,000, funds provided from Sohio operations during those 5 years amounted to only $91,691,000. The remaining $78,502,000, necessary for the extensive growth in much-needed operations and in replacement and expansion of plant facilities had to be supplied by new stock issues and borrowings in the amount of $61,382,000 and from other sources.

Today Sohio employs between 10,500 and 11,000 people and has some 19,000 stockholders.

As an independent company, free from connection with or domination by any other company, Standard Oil Co. (Ohio) competes in Ohio with five other former subsidiaries of Standard of New Jersey, and, through companies named Sohio and Fleet-Wing, it competes outside the State of Ohio in crude-oil procurement and sales to jobbers.

Now Sohio is engaged in a 3-year program of capital investment totaling close to $100,000,000.

Typical of the program is the current investment of $4,500,000 in the expansion and improvement of the catalytic cracking facilities at Cleveland No. 1 refinery.

The present catalytic cracking unit was built in 1944 to produce aviation gasoline, then essential to wartime needs, and has a capacity of approximately 12,000 bbl. of feed stock per day.

Last October the company began operation of its new $11,000,000 fluid catalytic cracking plant at its big Lima refinery. The new cat cracker is the first unit to be completed in the broad, $30,000,000 expansion and modernization program designed to transform Lima refinery into the most modern and strategically located refining center in the state.

Just 10 years ago Sohio started major crude-oil transportation on the Ohio-Mississippi River system.

In 1939 the first chartered towboat and barges laid the foundation for Sohio's operation of today's modern, streamlined fleet.

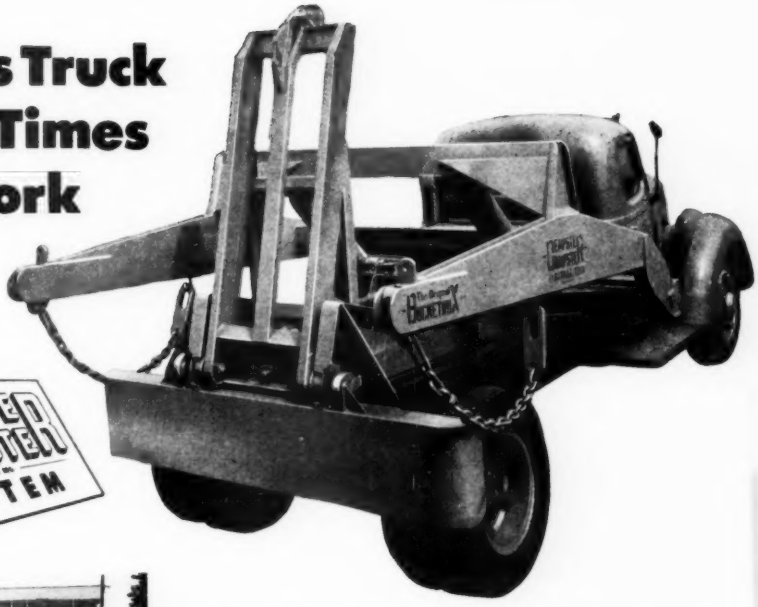
Crude-oil pipe lines as well as product pipe lines are a major factor in the company's operations.

Sohio has joined with Sun Oil Co. in the 1,000-mile Mid-Valley crude-oil pipe line from Longview, Tex., to Lima. This line will cost about $56,000,000 and will serve refineries in Ohio as a common carrier.

Additionally, Sohio now operates 370 miles of petroleum-product pipe lines in Ohio.

# Now This Truck Does 10 Times More Work

## In The DEMPSTER DUMPSTER SYSTEM



## Picks-Up, Hauls, Dumps Four Railroad Cars of Materials Daily!

Before the Dempster-Dumpster Hoisting Unit was installed on the above truck chassis, it was one of 10 conventional trucks being loaded by hand. Now, the truck hoisting unit has replaced all 10 trucks. In many plants handling materials by the Dempster-Dumpster System, one Truck Hoisting Unit has replaced from 5 to 10 conventional trucks. In each plant a single hoisting unit handles many containers. In one particular installation, one unit serves 37 detachable containers of various types and sizes, ranging from 2½ to 8 cu. yds. This plant produces, daily, approximately 220 cu. yds. (about 4 car loads) of materials of every description, including rubbish, scrap and finished product. This daily output is handled in only eight hours by the Dempster-Dumpster equipment. Containers are spotted at materials' accumulation points throughout the plant. When each container is filled, it is picked up by the truck hoisting unit, carried to the point of disposal, set down intact or dumped and returned for refilling. The entire operation is hydraulically controlled and handled by only one man, the driver. This modern system is eliminating much equipment investment in industrial plants. It is cutting maintenance costs, tire and gas requirements. But, most important, it increases production with a minimum of manpower. Don't assume that your problem is different—that the Dempster-Dumpster System of materials handling is not applicable to your problem. Such cases have happened, only to discover later that this equipment was exactly the type needed. Our most difficult job in our advertising is to make the wide use . . . the flexibility and simplicity of the Dempster-Dumpster operation clear to the reader. It will pay you to investigate the Dempster-Dumpster System now! A product of Dempster Brothers, Inc.

***Pictured at left is a standard drop bottom type container in three stages of operation—on the ground, in carrying position, and dumping.***

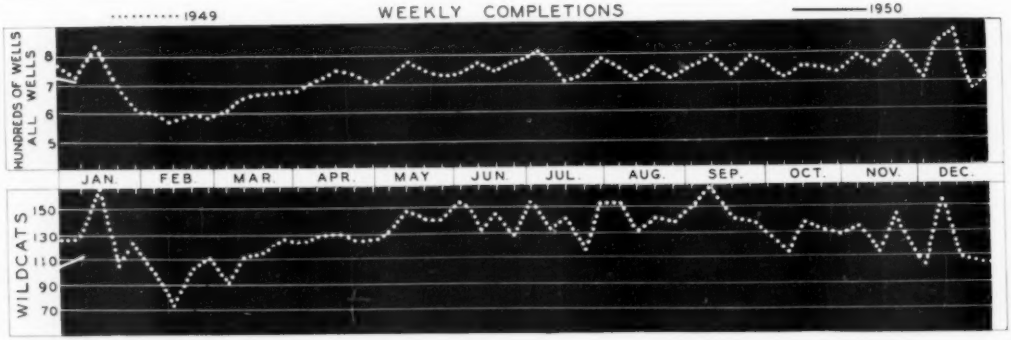
## DEMPSTER BROTHERS

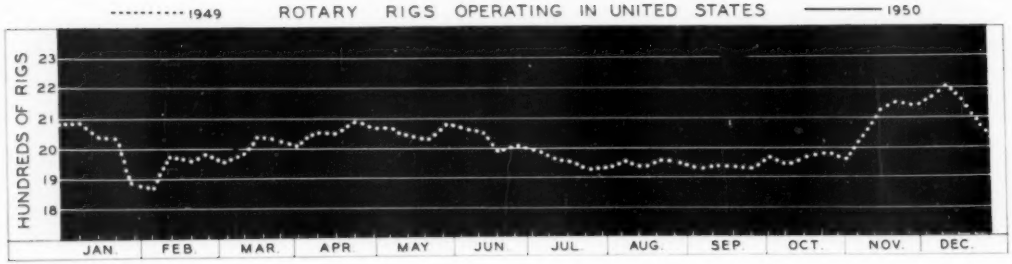
**510 Dempster Bldg., Knoxville 17, Tenn.**

## WEEKLY WELL COMPLETIONS . . . WEEK ENDED JANUARY 7, 1950

| | Total of all wells | | | | | Jan. 7 | | Wildcat completions and discoveries | | | | | Cumulative total, 1950 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Comp. | Oil | Gas | Dry | Footage | 1950 | 1949 | Oil | Dist. | Gas | Dry | Total | Oil | Dist. | Gas | Dry | Total |
| New York | 16 | 8 | 0 | [2]8 | 24,348 | 16 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pennsylvania | 24 | 8 | 5 | [2]11 | 38,912 | 24 | 34 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| West Virginia | 14 | 2 | 8 | 4 | 38,872 | 14 | 6 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 |
| Ohio | 19 | 6 | 7 | [2]6 | 37,956 | 19 | 13 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 |
| Indiana | 41 | 19 | 2 | 20 | 73,696 | 41 | 22 | 0 | 0 | 1 | 3 | 4 | 0 | 0 | 1 | 3 | 4 |
| Kentucky | 27 | 13 | 4 | 10 | 50,224 | 27 | 8 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| Illinois | 58 | 27 | 0 | [3]31 | 121,204 | 58 | 46 | 0 | 0 | 0 | 11 | 11 | 0 | 0 | 0 | 11 | 11 |
| Michigan | 24 | 9 | 2 | 13 | 44,771 | 24 | 20 | 4 | 0 | 0 | 8 | 12 | 4 | 0 | 0 | 8 | 12 |
| Kansas | 50 | 21 | 4 | [3]25 | 160,239 | 50 | 49 | 0 | 0 | 0 | 10 | 10 | 0 | 0 | 0 | 10 | 10 |
| Neb. Mo., Iowa | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Oklahoma | 68 | 36 | 5 | [2]27 | 246,794 | 68 | 64 | 4 | 0 | 2 | 11 | 17 | 4 | 0 | 2 | 11 | 17 |
| Texas | 229 | 159 | 17 | 53 | 922,659 | 229 | 232 | 8 | 0 | 5 | 20 | 33 | 8 | 0 | 5 | 20 | 33 |
| North Central (Dist. 7-B & 9) | 64 | 40 | 0 | 24 | 194,143 | 64 | 83 | 4 | 0 | 0 | 3 | 7 | 4 | 0 | 0 | 3 | 7 |
| West (Dist. 7-C & 8) | 44 | 34 | 0 | 10 | 224,116 | 44 | 40 | 2 | 0 | 0 | 8 | 10 | 2 | 0 | 0 | 8 | 10 |
| Panhandle (Dist. 10) | 37 | 28 | 8 | 1 | 110,596 | 37 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Eastern (Dist. 5, 6, & 6-P) | 23 | 19 | 2 | 2 | 96,208 | 23 | 6 | 0 | 0 | 1 | 2 | 3 | 0 | 0 | 1 | 2 | 3 |
| Gulf Coast (Dist. 2 & 3) | 33 | 24 | 1 | 8 | 177,365 | 33 | 43 | 2 | 0 | 1 | 4 | 7 | 2 | 0 | 1 | 4 | 7 |
| Southwest (Dist. 1 & 4) | 28 | 14 | 6 | 8 | 120,231 | 28 | 40 | 0 | 0 | 3 | 3 | 6 | 0 | 0 | 3 | 3 | 6 |
| Louisiana | 69 | 44 | 11 | 14 | 281,415 | 69 | 60 | 1 | 0 | 0 | 3 | 4 | 1 | 0 | 0 | 3 | 4 |
| Northern | 61 | 39 | 10 | 12 | 229,378 | 61 | 46 | 1 | 0 | 0 | 3 | 4 | 1 | 0 | 0 | 3 | 4 |
| Southern | 8 | 5 | 1 | 2 | 52,037 | 8 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Arkansas | 12 | 5 | 0 | 7 | 41,405 | 12 | 0 | 0 | 0 | 0 | 4 | 4 | 0 | 0 | 0 | 4 | 4 |
| Mississippi | 7 | 3 | 0 | 4 | 45,625 | 7 | 9 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 2 | 2 |
| Southeastern States | 2 | 1 | 0 | 1 | 15,276 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Montana | 1 | 1 | 0 | 0 | 3,037 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Wyoming | 4 | 2 | 0 | 2 | 15,358 | 4 | 8 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 2 | 2 |
| Colorado-Utah | 1 | 0 | 0 | 1 | 1,811 | 1 | 4 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 |
| New Mexico | 15 | 9 | 2 | 4 | 59,196 | 15 | 8 | 1 | 0 | 0 | 2 | 3 | 1 | 0 | 0 | 2 | 3 |
| California | 33 | 30 | 0 | 3 | 170,638 | 33 | 40 | 2 | 0 | 0 | 3 | 5 | 2 | 0 | 0 | 3 | 5 |
| Total United States | 714 | 403 | 67 | 244 | 2,393,456 | 714 | 645 | 21 | 0 | 8 | 82 | 111 | 21 | 0 | 8 | 82 | 111 |
| Total previous week | 725 | 417 | 60 | 248 | 2,651,665 | | | 16 | 1 | 3 | 87 | 107 | 932 | 84 | 191 | 5,598 | 6,805 |
| Total January 8, 1949 | 745 | 434 | 38 | 273 | 3,072,104 | | | 24 | 1 | 2 | 101 | 128 | 24 | 1 | 2 | 101 | 128 |

Service wells included: [2]8, [3]9, [2]2, [3]1, [2]3.



## DAILY AVERAGE PRODUCTION FOR WEEK

| | Dec. 7 crude oil | B. of M. Dec. demand | Dec. 31 crude oil |
|---|---|---|---|
| Alabama | 1,550 | 1,200 | 1,600 |
| Arkansas | 74,800 | 85,000 | 74,650 |
| California | 867,700 | 840,000 | 867,100 |
| Colorado | 65,400 | 74,000 | 65,600 |
| Eastern | 58,500 | 60,900 | 58,600 |
| Florida | 1,050 | 1,000 | 830 |
| Illinois | 186,200 | 185,000 | 178,000 |
| Indiana | 31,000 | 29,000 | 27,800 |
| Kansas | 245,650 | 295,000 | 273,750 |
| Kentucky | 27,400 | 23,000 | 25,100 |
| Louisiana | 539,575 | 542,000 | 536,900 |
| North Louisiana | 121,550 | | 121,300 |
| South Louisiana | 418,025 | | 415,600 |
| Michigan | 45,600 | 45,000 | 43,100 |
| Mississippi | 93,150 | 107,000 | 101,500 |
| Montana | 23,800 | 25,000 | 24,200 |
| Nebraska | 1,450 | 700 | 1,450 |
| New Mexico | 131,225 | 138,000 | 131,800 |
| Oklahoma | 416,350 | 420,000 | 409,650 |
| Texas | 1,929,000 | 2,230,000 | 1,976,700 |
| Dist. 1 (Southwest) | 26,200 | | 26,000 |
| Dist. 2 (Southwest) | 112,850 | | 116,625 |
| Dist. 4 (Southwest) | 178,200 | | 185,825 |
| Dist. 3 (Gulf Coast) | 357,575 | | 366,775 |
| Dist. 5 (Eastern) | 32,550 | | 33,800 |
| Dist. 6 (Eastern) | 81,425 | | 83,900 |
| East Texas field | 222,000 | | 236,000 |
| Dist. 7-C (West) | 46,950 | | 51,075 |
| Dist. 8 (West) | 572,850 | | 582,400 |
| Dist. 7-B (W. Central) | 62,300 | | 61,375 |
| Dist. 9 (N. Central) | 143,500 | | 140,525 |
| Dist. 10 (Panhandle) | 92,600 | | 92,400 |
| Utah | 3,200 | 1,200 | 3,200 |
| Wyoming | 129,900 | 127,000 | 134,300 |
| Total United States | *4,872,500 | 5,230,000 | 4,935,830 |
| Change from prev. week, down | 63,330 | | |

Total U. S. production January 1-January 7 †34,733,300 bbl.
Same period last year (crude plus cond.) 39,028,735 bbl.

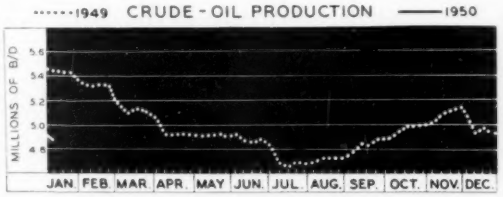
*Not incl. 89,400 bbl. condensate. †Incl. 625,800 bbl. condensate.

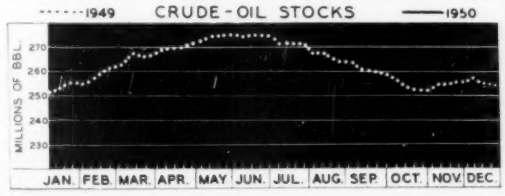
## CRUDE-OIL STOCKS BY STATES OF ORIGIN*

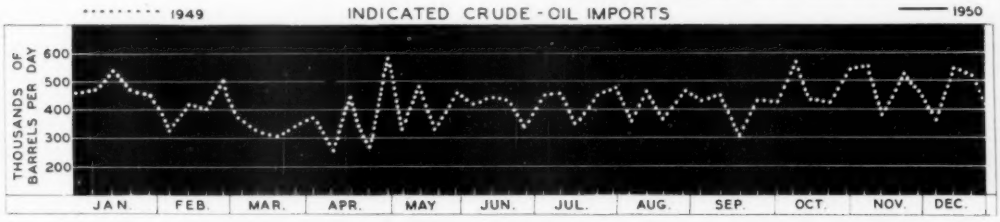
(Thousands of barrels)

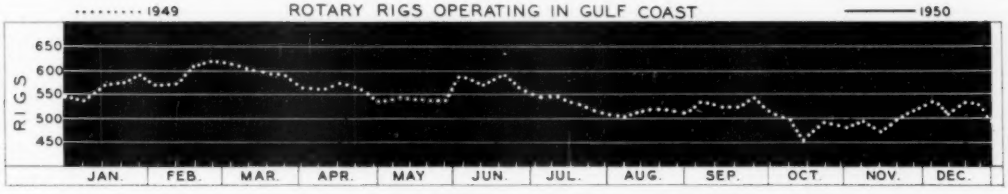
| | Dec. 31, 1949 | Dec. 24, 1949 | Jan. 1, 1949 |
|---|---|---|---|
| Pennsylvania Grade | 2,837 | 2,831 | 2,874 |
| Other Appalachian | 1,879 | 1,908 | 1,455 |
| Illinois, Indiana, Michigan | 12,089 | 12,191 | 12,969 |
| Arkansas | 3,005 | 2,958 | 3,452 |
| Louisiana | 14,061 | 14,115 | 12,147 |
| North | 3,362 | 3,467 | 3,004 |
| Gulf | 10,699 | 10,648 | 9,143 |
| Mississippi | 2,254 | 2,149 | 2,615 |
| New Mexico | 7,622 | 7,471 | 6,321 |
| Oklahoma and Kansas | 38,073 | 38,147 | 36,232 |
| Texas | 114,534 | 116,572 | 120,934 |
| East Texas | 15,978 | 15,703 | 16,600 |
| West Texas | 42,157 | 43,623 | 46,726 |
| Texas Gulf | 30,141 | 30,687 | 29,835 |
| Other Texas | 26,258 | 26,559 | 27,773 |
| Rocky Mountain | 13,339 | 13,583 | 12,547 |
| California | 38,749 | 37,566 | 33,750 |
| Foreign | 6,607 | 7,339 | 7,456 |
| Total United States | 254,449 | 256,830 | 252,752 |

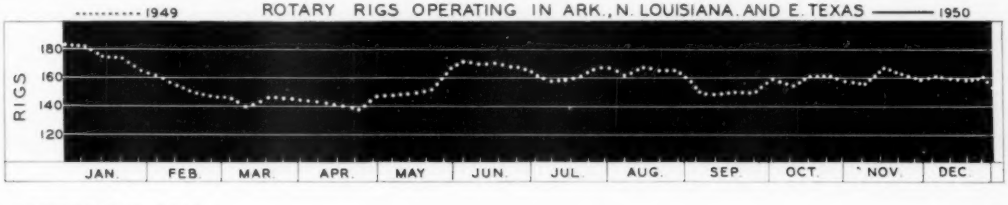
*Bureau of Mines.





1949 ROTARY RIGS OPERATING IN ARK., N. LOUISIANA AND E. TEXAS 1950
RIGS
180
160
140
120
JAN. FEB. MAR. APR. MAY JUN. JUL. AUG. SEP. OCT. NOV. DEC.

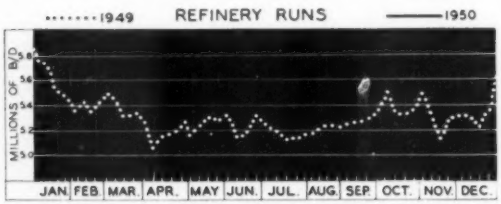
## A.P.I. REFINERY REPORT, DECEMBER 31

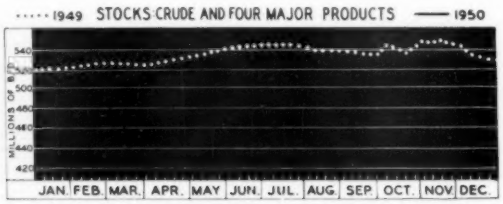
(Thousands of barrels)

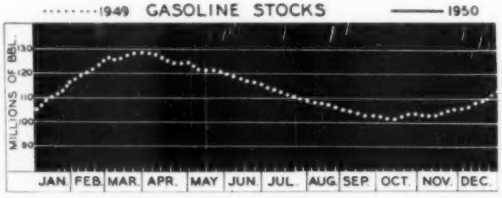
| District— | Daily avg. crude runs | Daily average production: Gasoline* | Kerosine | Distillate | Residual | Stocks at refineries, bulk terminals, in transit and in pipe lines: Gasoline† | Kerosine | Distillate | Residual |
|---|---|---|---|---|---|---|---|---|---|
| East Coast | 879 | 359.7 | 36.4 | 244.7 | 219.3 | 24,019 | 9,170 | 23,730 | 10,735 |
| Appalachian: | | | | | | | | | |
| District 1 | 96 | 43.9 | 6.7 | 15.0 | 10.3 | 2,785 | 312 | 846 | 342 |
| District 2 | 69 | 38.0 | 6.9 | 10.1 | 13.9 | 1,326 | 130 | 226 | 110 |
| Ind., Ill., Ky. | 1,006 | 502.7 | 57.1 | 169.4 | 178.8 | 23,061 | 3,906 | 11,011 | 3,799 |
| Okla., Kans., Mo. | 449 | 240.4 | 23.4 | 88.7 | 59.4 | 10,687 | 1,045 | 5,452 | 1,478 |
| Inland Texas | 196 | 139.3 | 10.3 | 21.1 | 38.4 | 3,992 | 464 | 985 | 963 |
| Texas Gulf Coast | 1,397 | 640.4 | 121.9 | 289.2 | 234.6 | 16,704 | 3,112 | 14,941 | 6,567 |
| La. Gulf Coast | 454 | 233.2 | 64.0 | 93.4 | 59.6 | 6,419 | 1,128 | 4,535 | 2,222 |
| N. La. and Ark. | 80 | 29.3 | 6.1 | 11.7 | 13.9 | 2,744 | 300 | 647 | 270 |
| Rocky Mountain: | | | | | | | | | |
| New Mexico | 12 | 6.1 | | 1.9 | 2.7 | 93 | 25 | 74 | 31 |
| Other Rocky Mtn. | 169 | 89.7 | 6.3 | 30.3 | 32.3 | 3,583 | 271 | 1,823 | 646 |
| California | 817 | 398.9 | 14.6 | 108.9 | 343.1 | 18,084 | 975 | 13,531 | 34,512 |
| December 31, 1949 | 5,626 | 2,721.6 | 353.7 | 1,084.4 | 1,206.3 | 113,497 | 20,838 | 77,801 | 61,675 |
| December 24, 1949 | 5,482 | 2,577.9 | 360.7 | 1,047.9 | 1,149.4 | 110,164 | 20,894 | 78,662 | 61,647 |
| January 1, 1949 | 5,958 | 2,694.1 | 360.9 | 1,176.4 | 1,430.3 | 104,063 | 24,258 | 72,495 | 63,642 |

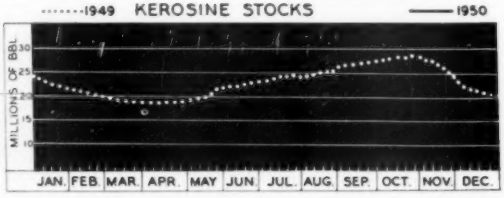
| Bureau of Mines, December 1948 | Daily avg. crude runs | Daily average production: Gasoline* | Kerosine | Distillate | Residual |
|---|---|---|---|---|---|
| East Coast | 856 | 322.9 | 39.8 | 211.4 | 241.5 |
| Appalachian: | | | | | |
| District 1 | 101 | 45.4 | 7.7 | 15.0 | 14.7 |
| District 2 | 72 | 36.4 | 4.9 | 7.9 | 14.5 |
| Ind., Ill., Ky. | 939 | 483.1 | 62.5 | 152.7 | 158.7 |
| Okla., Kans., Mo. | 437 | 240.6 | 22.5 | 75.1 | 80.6 |
| Inland Texas | 250 | 162.0 | 14.8 | 22.3 | 59.3 |
| Texas Gulf Coast | 1,468 | 645.3 | 112.2 | 334.1 | 259.2 |
| La. Gulf Coast | 452 | 200.1 | 58.2 | 100.4 | 74.6 |
| N. La. and Ark. | 85 | 33.2 | 8.8 | 11.3 | 20.1 |
| Rocky Mountain: | | | | | |
| New Mexico | 14 | 7.5 | 0.5 | 2.1 | 3.7 |
| Other Rocky Mtn. | 152 | 71.6 | 4.3 | 26.4 | 34.9 |
| California | 965 | 378.1 | 13.8 | 151.7 | 399.9 |
| | 5,791 | 2,626.2 | 350.0 | 1,110.4 | 1,361.7 |

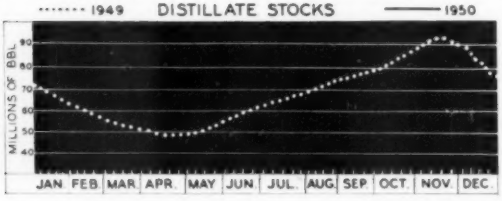
*At refineries including natural blended. †Finished and unfinished.

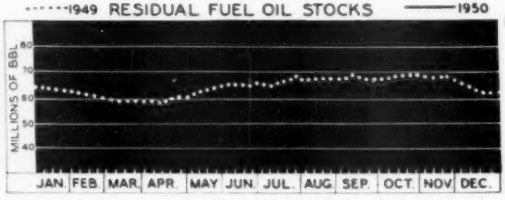


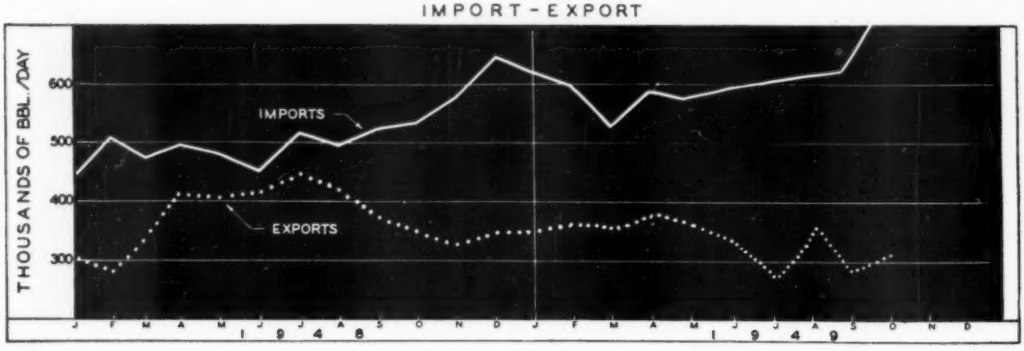



## CRUDE PRICES GRAVITY SCHEDULE

| Gravity— | Calif. Hill, Signal | Kansas homa, Okla- | Tex.* Coast Gulf | Tex.† West |
|---|---|---|---|---|
| 18-18.9 | $1.53 | | | |
| 19-19.9 | 1.63 | | | |
| 20-20.9 | 1.73 | $2.25 | | $2.12 |
| 21-21.9 | 1.82 | 2.27 | | 2.14 |
| 22-22.9 | 1.92 | 2.29 | | 2.16 |
| 23-23.9 | 2.02 | 2.31 | | 2.18 |
| 24-24.9 | 2.12 | 2.33 | $2.56 | 2.20 |
| 25-25.9 | 2.22 | 2.35 | 2.58 | 2.22 |
| 26-26.9 | 2.31 | 2.37 | 2.60 | 2.24 |
| 27-27.9 | 2.37 | 2.39 | 2.62 | 2.26 |
| 28-28.9 | 2.42 | 2.41 | 2.64 | 2.28 |
| 29-29.9 | 2.48 | 2.43 | 2.66 | 2.30 |
| 30-30.9 | 2.54 | 2.45 | 2.68 | 2.32 |
| 31-31.9 | 2.59 | 2.47 | 2.70 | 2.34 |
| 32-32.9 | 2.64 | 2.49 | 2.72 | 2.36 |
| 33-33.9 | | 2.51 | 2.74 | 2.38 |
| 34-34.9 | | 2.53 | 2.76 | 2.40 |
| 35-35.9 | | 2.55 | 2.78 | 2.42 |
| 36-36.9 | | 2.57 | 2.80 | 2.44 |
| 37-37.9 | | 2.59 | 2.82 | 2.46 |
| 38-38.9 | | 2.61 | 2.84 | 2.48 |
| 39-39.9 | | 2.63 | 2.86 | 2.50 |
| 40 and above | | 2.65 | 2.88 | 2.52 |

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947. Above changes do not include recent reductions of a few buyers applying principally to low-gravity grades.

## FLAT CRUDE PRICES

Representative posted schedules per barrel.

| | |
|---|---|
| East Texas† | $2.65 |
| Kettleman Hills, California* | 2.77 |
| Beauregard Parish | 2.6( |
| Illinois Basin | 2.77 |
| Pecos County, Texas (Yates) | 2.35 |
| Bradford, Pennsylvania | 3.54 |
| Eastern Ill. and Western Ind.† | 2.77 |
| Tomball, Texas Gulf Coast | 2.83 |

*37°-37.9°. †35° and above.

ESSO STANDARD OIL CO. increased cargo price for kerosine on the Gulf Coast by .5 cent a gallon and the New York Harbor barge price by .6 cent a gallon in an effort to promote increased production to meet rising demand for the product.

At the end of the year, kerosine stocks in the Gulf-East Coast area were about 2,400,000 bbl. less than at the end of 1948, compared with a reduction of 3,400,000 bbl. for the country as a whole.

For several weeks, increased prices have been necessary to secure kerosine cargoes at Gulf Coast ports, and current reports indicate that the top of 8.5 cents a gallon is not finding too much material.

The lack of real winter-time weather in the northeastern states continues to soften the distillate markets in the area. Spot barge lots of No. 2 fuel were offered at 7.9 cents a gallon in the Harbor compared with the most generally quoted price of 8.2 cents. Total distillate stocks decreased only 860,000 bbl. in the last week of the year, compared with an average weekly reduction of 3,600,000 bbl. in the first part of December.

Mid-Continent fuel prices continued a gradual upward climb under the influence of increased demand for heating oils. Kerosine moved up to a range of 8.125-8.5 cents a gallon, with most of the spot quotations above 8.25 cents. Distillate prices strengthened, with most of the spot movement at better than 7.25 cents.

The residual market remains rather tight in the Mid-Continent with low-sulfur material hard to find on the open market. However, the number of inquiries has dropped from the December peak when consumers were trying to cover first-quarter requirements.

## REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of January 9, 1950. Figures are f.o.b plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

### GASOLINE, KEROSINE, AND FUEL OILS

| | Mid-Continent Group 3 | New York Harbor (barge) | Tex. Gulf Coast |
|---|---|---|---|
| Regular gasoline, 74-76 octane | 9½-10 | 10.5-11.1 | 9-9¾ |
| Premium gasoline, 78-80 octane | 10⅜-11 | 11.5-12.1 | 9¾-10¾ |
| 42-44 w.w. kerosine | 8¼-8½ | 8.9-9.5 | 8¼-8½ |
| No. 2 straw fuel oil | 7¼-7½ | 7.9-8.5 | 7-7¼ |
| No. 6 residual | $1.25-1.35 | $2.00 | $1.65-1.75 |

### NATURAL GASOLINE

| | Group 3 | North Texas | N. La |
|---|---|---|---|
| Grade 26-70 | 5⅞ | 5⅜ | 5⅝ |
| Grade 18-55 | 7.1 | 6.5 | 6 8 |

### LUBRICATING OILS SOUTH TEXAS

| | |
|---|---|
| 200 vis., No. 2-3 neutral | 10.5 |
| 750 vis., No. 3-4 neutral | 12.75 |
| 2,000 No. 5-6 neutral | 14-14.5 |

### LUBRICATING OILS Mid-Continent

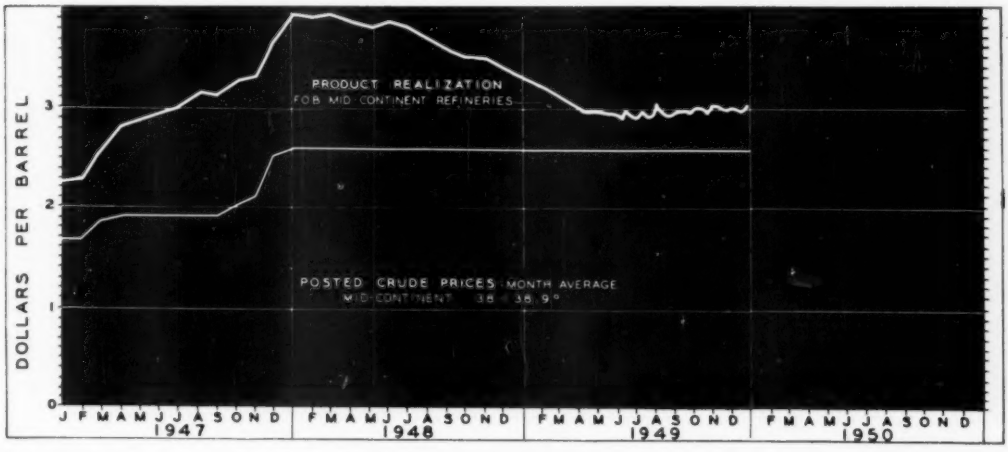
| | |
|---|---|
| 150-160 vis., D bright stock, 0-10 pp. | 17-19 |
| 200 vis., No. 3 neutral, 0-10 pp. | 11.5-14 |

### Western Pennsylvania

| | |
|---|---|
| 145-155 vis., 10 p.t. bright stock | 19.5-20.5 |
| 180 vis., 0 p.t. neutral | 20.5-21.5 |

### WAX Mid-Continent

| | |
|---|---|
| 132-134 A.M.P. | 4.25 |


PRODUCT REALIZATION
F.O.B. MID-CONTINENT REFINERIES
POSTED CRUDE PRICES: MONTH AVERAGE
MID-CONTINENT 38 - 38.9°
DOLLARS PER BARREL
0
1
2
3
J F M A M J J A S O N D
1947
F M A M J J A S O N D
1948
F M A M J J A S O N D
1949
F M A M J J A S O N D
1950

*In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate, and fuel oil*

# EQUIPMENT MEN . . . in the News

## Limbert Named by Dravo for Fabricated Piping Sales

Geo. B. Limbert & Co., Inc., Chicago, has been appointed representative for Dravo Corp., Pittsburgh in the sale and installation of fabricated piping for industrial plants, oil fields, central utility stations, and gas-transmission systems. The Limbert company, headed by DeWitt C. Showers and John D. Purdy, will handle Dravo piping in Illinois, Wisconsin, Minnesota, Iowa, northwest Indiana, western Michigan, and St. Louis County, Missouri.

## Trask and Bukowsky Get New Roebling Positions

E. A. TRASK

G. C. BUKOWSKY

E. A. Trask, former head of the San Francisco office of John A. Roebling's Sons Co. of California, has assumed his duties as manager of sales of the company's Chicago corporation. G. C. Bukowsky, former manager of the Portland, Ore., branch, succeeded Trask. The appointments were announced by E. C. Low, vice president in charge of sales.

Trask joined the Roebling organization 25 years ago, starting as a warehouseman and splicer. He became a salesman in 1931 and 9 years later was made manager of the San Francisco branch.

Bukowsky, a graduate of University of Oregon, has also been associated with Roebling since 1925, starting as a salesman. He was elevated to the managerial post at Portland in 1942.

## Kaiser Steel Pours Million Tons in 1949

The millionth ton of steel ingots for the calendar year 1949 was poured on December 29 at the Fontana plant of Kaiser Steel Corp., marking the first time that any Pacific Coast steel company has produced a million tons of steel ingots in a single year.

Attainment of this record was made possible in part by the addition of a second blast furnace, which was "blown in" in October, doubling the mill's potential pig-iron capacity. The increased production of hot pig iron together with the addition of a seventh open-hearth furnace a year ago give Fontana a potential of 1,130,000 tons of steel ingots per year.

Early in 1950 Kaiser Steel expects to begin operation of a new hot-rolled strip mill for the production of hot-rolled strip and sheet up to 72 in. wide, and a new electric-weld pipe mill to produce pipe from $5^1/_2$ to $12^3/_4$-in. in diameter.

F. M. Rich, vice president in charge of operations for Kaiser Steel, has transferred his headquarters from Oakland to the mill at Fontana. This move was made in connection with the increased volume of operations at Fontana and the further increase that is anticipated with the opening of the new hot strip mill and electric-weld pipe mill.

## Rockwell Makes Northcutt District Sales Manager

J. W. NORTHCUTT

W. F. Rockwell, Jr., president of Rockwell Manufacturing Co., has announced the appointment of J. W. Northcutt as Atlanta district sales manager to succeed C. C. Moore who has been transferred to manage the company's new district office in Columbus.

Northcutt received a mechanical-engineering degree from Oklahoma A. & M. College. In 1936 he joined the Tulsa district office and became sales engineer for all the company products in the Corpus Christi area. Prior to his present assignment he handled all major oil and engineering-company accounts in the Houston district.

Moore is a graduate engineer of Washington and Lee University. He was affiliated with Lynchburg Foundry Co. for 10 years before joining Mesta Machine Co. in 1923. Shortly thereafter he operated his own selling agency. In 1930 he became manager of meter parts for Pittsburgh Equitable Meter Co. He became Atlanta district manager in 1943 and held this position until his transfer to the Columbus district office.

## Russell and Griswold Are Elected Dowell Directors

W. J. RUSSELL

N. D. GRISWOLD

William J. (Bill) Russell, assistant manager of Dowell Incorporated in Tulsa, and Nelson D. Griswold, former chief engineer for Dowell in Tulsa, have been elected to the board of directors of the organization.

Russell, who came to Tulsa in 1945, has been with Dowell since 1934. He graduated in electrical engineering from North Carolina State in 1927. He then joined the Henry L. Dogherty Co. as junior engineer and completed petroleum-engineering training in 1929. He joined Dowell in Shreveport. Since joining Dowell he has served as district manager at Tulsa, and Seminole, Okla., and for 7 years at Midland, Tex.

Griswold served Dowell as chief engineer in Tulsa and is now assistant general manager of Dowell's parent company, Dow Chemical Co., in Freeport, Tex. He joined Dow in 1927 as an engineer in the power division. Later he became assistant superintendent, power division, then design engineer in the engineering department and chief engineer at Cliffs Dow, in Marquette, Mich.

In 1939 Griswold came to Dowell as chief engineer, a position he left in 1941 to join Texas Dow at Freeport. He was named assistant general manager early in 1942 and a director of Dow Chemical in 1948. He is also director and vice president of another Dow subsidiary, Brazos Oil & Gas Co.

## Brothman Associated With Industrial Process Firm

Industrial Process Engineers, Newark, engineers, designers, and manufacturers of processing plants and equipment, has announced the appointment of A. Brothman as consulting associate of the company. Brothman, internationally famous chemical-processing authority and author, heads the engineering firm of A. Brothman & Associates, Long Island City.

*(Continued on page 127)*

Your MARKET PLACE FOR THE OIL AND GAS INDUSTRY...

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DISPLAY CLASSIFIED
$12.00 a column inch one issue . . .
10% Discount three or more issues.

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ROLAGRIP COUPLINGS—For Sale, 10 tons, 1½" to 8" inclusive. New, never used, complete with bolts and neoprene gaskets. Price 50% less than manufacturers selling price. Send for list. JULIUS M. FOGELMAN, Reading, Pa.

ONE 8'x27½ Type XYCP National Emulsion Treater complete. Never used, located Basin, Wyoming. Considerable reduction. Write Box 754 or phone 93193, Billings, Montana.

FOR SALE: Approximately 25 miles 4" OD plain end pipe in line. Public Service Corp. of Texas, 902 Burk Burnett Bldg., Fort Worth, Texas.

FOR SALE: Approximately 15,000 feet of 6" OD "Invasion" Steel Pipe, Wt. about 9#, 6⅝" OD Plain Ends, 20' lengths. New condition. Also, approximately 15,000 feet of 6⅝" OD Plain End Stand Black Steel Pipe, No. 2 Grade. M. KAPLAN & SON, Box 1883, Phone 942, Monroe, Louisiana.

**Dismantling Complete Refinery**
**FOR SALE**

Any and all parts of the Carter Oil Refinery at Billings, Montana.

Wire, Write or Call

**PEPCARR COMPANY**
Billings 92180

**NEW Byron Jackson "Pup" Centrifugal Pumping Units with Chrysler Ind-9 engines — Army surplus — export boxed with parts and tools—condition perfect—supply limited—price attractive—available for immediate shipment from Houston.**

**HALLORAN EQUIPMENT CO.**
431 Kress Bldg. Ph. CA-1447
Houston 2, Texas

**FOR SALE**

12—230 H.P. Type 10 Bessemer New 17" Power Cylinders complete ready to run with 16" to 18" Compressors. 1—230 H.P. Clark Horizontal with Compressors. Located Salem, Illinois.

**ENGLE PETROLEUM, Incorporated**
Box 655, Evansville, Indiana

**DIESEL ENGINE REPAIR AND HEAVY MACHINE SHOP FOR SALE**

Consisting of land, buildings, machinery, equipment, cars and trucks. Established in central United States over forty years.

*For Complete Details Write*

**BOX D-320**

**THE OIL AND GAS JOURNAL**
Tulsa, Oklahoma

## EQUIPMENT FOR SALE

FOR SALE: 3,000 Ft. 10¾" O.D. 32#; 6,000 Ft. 8⅝" O.D. 24#; 4,000 Ft. 7" O.D. 20#; 10,000 Ft. 7" O.D. 17#; 14,000 Ft. 5½" O.D. 14#; 20,000 Ft. 2" tubing 4.6#; 50,000 Ft. 2" line pipe 4#. All of this pipe is exceptionally good quality used lapweld. Priced very reasonably. Can be inspected at Marietta. The Interstate Pipe & Supply Company, Marietta, Ohio. Phone 2468.

FRANKS Senior Well Servicing Unit with 8 x 10 inch, 50 foot mast. On Dodge truck. Location—California. Write Box D-324, The Oil and Gas Journal, Tulsa, Oklahoma.

Several Army Surplus 4½" x 6" Gaso Duplex 1860 Pumps — two piece skid mounted with Chrysler 8 cylinder engines. Will sell pumps only or complete units about half price.

**H. H. COFFIELD**
**ATTN: W. H. Orr**
**Phones: 132—Rockdale, Texas**
**A-86064—Houston, Texas**

## EQUIPMENT FOR SALE

**FOR CABLE TOOLS**
**DEGEN PIPE AND SUPPLY CO.**
**Box 107, Red Fork Station, Tulsa, Oklahoma**

FOR SALE in the Seminole Field, 2—10' x 40' Horizontal Riveted Gasolene Storage Tanks. Cities Service Oil Co., Patridge, Bartlesville, Oklahoma.

NATIONAL "50" Compound Double Drum Rig 126' Cantilever Ideco Mast, 10' substructure, 6,000' 4½" drill pipe, this rig complete and in excellent condition. P.O. Box 205 Sta. B, Bakersfield, California.

**PACKAGED $H_2S$ REMOVAL UNITS**

We offer prompt shipment on skid-mounted hydrogen sulfide removal units for treating sour gas for pipe line or fuel gas purposes.

**GRAFF ENGINEERING & EQ'PT. CO.**
3415 Westminster, Dallas 5, Texas

# FOR SALE

5,600'—8⅝" O.D. 28# Lapweld T&C, Range 1
90,000'—6⅝" O.D. 17.65# Seamless, Range 3, Beveled
60,000'—6⅝" O.D. 19.79# Lapweld, T&C
80,000'—6" O.D. 9# New Invasion Pipe, Coated & Wrapped, range 3 tested 500# W.P. Beveled.
2—55,000 Bbl. All Steel Welded Tanks
1—80,000 Bbl. All Steel Welded
1—55,000 Bbl. All Steel Riveted
Sell cut down or standing, Located Longview, Tex.

**W. C. BERRY**
Box 1858 Tulsa, Oklahoma Phone 3-6141

## SPECIAL OFFERING 8640 STEEL ROUNDS

| | |
|---|---|
| QUANTITY: | 1637 Net Tons |
| SIZES: | 1149 Ton 4½" x 131"<br>143 Ton 6⅛" x 95"<br>345 Ton 7½" x 87" |
| POTENTIAL USES: | **Forging Billets,**<br>**Mechanical Tubing,** Hot Finished or Cold Drawn to Diameters 4½" to 8⅝", Wall Thickness Range ¼" to ½"<br>**Oil Country Casing,** 5½" 17#; 7" 23#; 8⅝" 32# Range 2<br>Yield 95,000# Minimum as against N80—80,000# |
| DELIVERY: | Billets—Immediate<br>Alloy Mechanical Tubing or Oil Country Casing—Fast Shipment |
| MILL LOCATION: | Pittsburgh District |

**PURCHASING DEPARTMENT**
**DRESSER INDUSTRIES, INC.**
1130 Terminal Tower, Cleveland 13, Ohio, Telephone: TOwer 1-7600

## EQUIPMENT FOR SALE

**FOR SALE: Two Fairbanks-Morse Diesel Engines, 150 H.P. Twin Cylinder, Horizontal Type. Completely overhauled. $1500.00 each. Melton Supply Co., Seminole, Okla.**

FOR SALE: We have just shut down the chemical portion of our gasoline-chemical plant in the Sasakwa Field and have available five 170 hp. Type 80 Cooper Twin Engine Compressor Units. Cities Service Oil Co., Patridge, Bartlesville, Okla.

FOR SALE at Bartlesville, one slightly used Addressograph Graphotype Model #6253. Hand operated with 110 volt motor drive. $450.00. Cities Service Oil Co., Patridge, Bartlesville, Okla.

**FOR NATURAL GASOLINE PLANT**
1—36" & 1—48" still; 1—60", 1—72" & 1—84" absorber. Miscellaneous heat exchangers, condensers, steam turbines, reciprocating and centrifugal pumps; reabsorber; scrubber tanks, valves, fittings and other items for use in natural gasoline plants. Detailed list on request. Contact Chas. Miller, Supt., **Midland Gasoline Co.**, Conroe, Tex.

# FOR SALE
# 10" PIPE

50,000'—10¾" O.D., 40.48#, 20' random, plain end, beveled for welding.

This pipe is secondhand in excellent condition and can be used as is for line pipe or we will thread for casing.

## Horwitz Pipe & Steel Company

**415 S. Western** **2-7591**
**Oklahoma City, Oklahoma**

**WATCH THIS SPACE FOR OUTSTANDING WEEKLY VALUES**

# BOILERS

3—1000 HP, Vogt, class VR, bent tube, water tube boilers, 300 lb. PSI, capacity 60,000 lbs. steam per hour, complete with Foster-Wheeler superheater, natural gas fired, ASME code. Used less than 2 years after installation in 1943.

2—800 HP, Babcock & Wilcox, integral furnace, type FF-16-44, water tube boilers, 200 lbs. PSI, capacity 54,000 lbs. steam per hour, natural gas fired, forced draft. Each boiler equipped with B. F. Sturtevant, size 100, design 7, class III, fans. Driven by Worthington-Moore steam turbine. Used less than 2 months after installation in 1946.

**DULIEN STEEL PRODUCTS, INC.**
*of Washington*
**P. O. BOX 667**
**COTTON VALLEY, LA.**
**PHONE: COTTON VALLEY 26**

## EQUIPMENT FOR SALE

FOR SALE: 1—36-L Bucyrus Rig, 1948 model, complete with all tools. Phone 2032, Henderson, Kentucky.

MUD hog pump 7¾ x 12 Gardner-Denver, mud hose. Fairbanks-Morse water pump. Wrenches, hand tools, etc., all at Wichita Falls. D. F. MacKinnon, 3200 Main Street, Dallas, Phone C-6415.

FOR SALE: At Craig, Colo., 828' of 6⅝" OD 24# 8 RT R 2 and 3 J-55 ST&C New Seamless Steel Casing $1.94 per foot. 787' of 10¾" OD. 40.50# H-40 R2 ST&C Seamless Steel New Casing $3.13. Cities Service Oil Co., Patridge, Bartlesville, Oklahoma.

## EQUIPMENT WANTED

WANTED: Two Sweetland Presses; Size #3 to 7 inclusive. Also, Oil Canner. Oklahoma Refining Company, Box 1265, Seminole, Oklahoma.

## HELP WANTED

WANTED—Petroleum engineer with production and well completion experience in Texas and other states, capable of handling all drilling and development problems of small but aggressive company. Please give complete data and references in first letter. Box D-335, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED—Geologist with major company experience, for general work in Mid-Continent area, Tulsa headquarters. State age, experience and salary expected. Address: P. O. 1743, Tulsa, Oklahoma.

**NEW** foreign and domestic Oil Employment Directory. Over 500 listings in drilling, production, refining, natural gasoline, pipe lines, geological, exploration, supplies, manufacturers, services; and trucking, refinery and pipe line contractors, showing where to apply for jobs. Price $5.00. Oil Industry Mailing List, Box 2603, Tulsa, Okla. (Our 28th year).

INDEPENDENT oil company with AAA-1 financial rating wants geologist minimum fifteen years experience geological and land department work. Experience in Oklahoma and land department experience essential. Attractive proposition including option to participate at base cost after drilling of well. Box D-330, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Mechanical design engineer and draftsman with minimum three years' experience oil refinery piping engineering. Engineering degree preferred. Permanent positions for qualified men. Give complete review experience record with application. Address E. M. Skinner, Chief Engineer, Socony-Vacuum Oil Co., Inc., Augusta, Kansas.

JUNIOR ENGINEER wanted by independent oil company operating in West and West Central Texas. Must be recent graduate with petroleum engineering degree. All replies should contain outline of training, past experience, if any, age, marital status, date of availability, and starting salary desired. Recent photo or snapshot would be helpful. Address Box D-342, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED—Sales Engineers. Large industrial instrument manufacturer requires the services of engineering graduates, preferably with industrial instrument experience, in the Chicago, Philadelphia, Pittsburgh, Detroit, Cleveland, and Houston districts. Good opportunity for men with right experience. Men with pneumatic control and electronic potentiometer experience given special consideration. Box D-344, The Oil and Gas Journal, Tulsa, Oklahoma.

## SITUATIONS WANTED

GEOLOGIST, B.S., 3½ yrs. subsurface experience in Cuba and Venezuela, desires a position with aggressive company, preferably domestic. Box D-308, The Oil and Gas Journal, Tulsa, Oklahoma.

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico Personal interview by appointment is desired. Makin Drilling Company, Box No 131, Ph. No. 131, Hobbs, New Mexico.

## SITUATIONS WANTED

**INSTRUMENT SUPERVISOR—Mechanical engineer with thirteen years experience in chemical plants and petroleum refinery. Box D-333, The Oil and Gas Journal, Tulsa, Oklahoma.**

**EXPERIENCED Office and Credit Management, Purchasing, Sales, Personnel and Administrative Work. Industrial and Oil Field Supplies. Presently employed Houston, but willing to move. Seek greater responsibility and opportunity. Excellent references. Write Box D-321, The Oil and Gas Journal, Tulsa, Okla.**

AVAILABLE March 1, 1950, Mechanical Supt., Master Mechanic, or Service and Erection Engineer. Age 35, 2 years Mechanical Engineering plus 12 years' experience, in refinery, chemical, gasoline, compressor and power house installations to 90,000 KW. Box D-343, The Oil and Gas Journal, Tulsa, Oklahoma.

## LEASE AND DRILLING BLOCKS

**SEE A. L. BOWLES, ADA, OKLA., FOR DRILLING DEALS, LEASES, ROYALTIES**

OWN 80 acres, not leased, offsetting 8,000,000-ft. Booch sand gas well, near Wetumka, in Hughes County. Will sell, lease or make drilling deal. Call or write: H. H. DARKS, WETUMKA, OKLAHOMA.

OFFERING large block of Southern saw timber with land and oil rights. Box D-341, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: Oil and Gas Leases and drilling propositions in shallow territory of Allen, Simpson, and Warren Counties, Kentucky, W. P. Harley, Bowling Green, Kentucky.

SELL oil and gas lease near deep and shallow production. 200 acres section 9, 1 north, 5 west, Stephens County. Hattie Harrell, Phone 931 East Highway, Duncan, Oklahoma.

**WANTED**
GOOD Oil Leases in Scurry County, Texas, and adjoining counties. Will drill immediately. Send sketch or map and full information to:
**Box D-340**
**THE OIL AND GAS JOURNAL**
**Tulsa, Oklahoma**

**WANT DRILLING DEAL ON PROVEN ACREAGE**
**Send FULL information at once to:**
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**THE OIL AND GAS JOURNAL**
**Tulsa, Oklahoma**

**LEASES ROYALTIES**
**Producing and Nonproducing**
**Bought and Sold—Any Area**
**Inquiries Invited**
**B. D. BUCKLEY**
**6376 Clayton Road, St. Louis 17, Mo.**

**NORTH DAKOTA MINERALS AND LEASES**
**Bought direct for you on your purchase order. My lease block map and reprint of press and magazine articles clearly outlining this play mailed on request.**
(Purchase orders accepted only from those connected with the oil industry or royalty business.)
*Wire, Write or Call*
**JOHN ALLEN**
**Suite 200, Grand Pacific Hotel**
**Bismarck, North Dakota**
(Member National Oil Scouts and Landmen Association. References exchanged.)

**LEASE AND DRILLING BLOCKS**

1,916-ACRE 5-year oil lease, 1/8th royalty, SW Wyoming, on anticline, $1.00 per acre. Good investment also in overriding royalty under Major oil co.'s leases 50 cents an acre. R. O. Barnsley, 950 Lincoln Ave., Palo Alto, Calif.

HAVE Kansas Water-flood prospect. Producing natural since 1911. Would like to hear from parties that would be interested in taking exploratory cores. Box 508, Emporia, Kansas.

**SCURRY COUNTY ROYALTIES**

Send for list of choice Scurry County royalties. Also have few townsite lot leases $300. Navarro Royalties Company, Odessa, Texas.

FOR SALE: Oil lease, partially under water flood. 900 acres under lease, of which 320 acres proven productive. Located Southeast Kansas. P. O. Box 31, Chanute, Kansas.

**ROYALTIES**

**DEEDED ROYALTIES**

San Juan Basin & Permian Basin. Write Harry S. Wright, Wright Bldg., Farmington, New Mexico.

**MONTANA ROYALTIES**

Millions of acres now leased by world's major companies, with huge drilling play in prospect. For booklet describing Montana geology and oil development, write Landowners Royalty Company, Box 1225, Great Falls, Montana.

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PATENT Practice before U. S. Patent Office. Validity and Infringement Investigations and Opinions. Booklet and form "Evidence of Conception" forwarded upon request. Lancaster, Allwine & Rommell, Registered Patent Attorneys, Suite 418, 815-15th Street, N.W., Washington 5, D. C.

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# Equipment Men

*(Continued from page 124)*

## Minneapolis-Honeywell Expands Sales Activities

Thomas McDonald, vice president, Minneapolis-Honeywell Regulator Co., has announced a number of personnel changes within the sales organization.

William W. Martenis has been named manager of sales engineering in which position he will assist in planning specifications, approve new developments, and coordinate activity between sales and engineering departments of the company.

Kent L. Wilson has been made manager of the company's newly formed manufacturers' division. He will assist A. H. Lockrae, vice president in charge of the heating controls division.

T. S. Carley, who has been Detroit branch manager, will succeed Wilson as head of the Honeywell-Brown office in Dallas. Karl Schick, former southwestern regional manager, is rejoining M.-H. after a year as a distributor for several companies in the Dallas area. He will be sales manager of the company's gas-controls division.

J. A. DePuy has been promoted to managership of the Detroit office, succeeding Carley. Jack Richardson, who has been manager of the industrial division's sales department in Detroit, will succeed DePuy as Cincinnati Honeywell-Brown branch manager, and James Dunlap, who has been with the Toledo office, has replaced Richardson in Detroit. Harry Merkel, of Pittsburgh branch, replaces Dunlap at Toledo.

## Cummins Sales Promotes E. G. Ellis, A. C. Zugar

The promotion of Earl G. Ellis to general service manager and A. C. Zugar to sales engineer have been announced from the Forth Worth headquarters of Cummins Sales & Service, Inc., by President and General Manager J. E. Everroad.

Ellis, former export service manager stationed at Caracas, Venezuela, is headquartered at Fort Worth. Zugar, formerly at the Odessa, Tex., service point, is at the new factory-type service shop at Oklahoma City.

Ellis has been with the company since 1941, where he started in the diesel department at Odessa. In 1943 he was transferred to the Houston branch and was promoted there to shop foreman in 1944 and to district service manager in 1945. He was transferred to Shreveport as service engineer in 1946 and went to New York as export service manager in 1947, leaving there for Venezuela.

Zugar came to Cummins in 1946 at Houston as a member of the diesel department. In November 1947 he was transferred to Odessa, where he became specialty salesman in 1948.

## Master Tank's New Pipe Mill Includes Expander

As an essential component part of its new No. 2 pipe mill, Master Tank & Welding, Ltd., of Dallas, has designed and installed a modern expanding unit, capable of handling line pipe up to 36 in. in diameter, ½ in. thick in sections 31½ ft. long.

When the top beam of the expanding unit is raised, the expansion cage is lifted, permitting pipe to roll into position. Hydraulic cylinders at both ends move in to form a pressure seal so that pipe can be filled with water.

The upper ram comes down under pressure of many tons to straighten the pipe. When the upper and lower rams are locked together, pipe is filled with water exerting an internal hydrostatic pressure up to 2,500 lb. which expands the pipe against true and straight dies attached to the cages. This action stretches the pipe beyond its diameter to raise the yield strength and at the same time brings the pipe to a true cylindrical shape.

## Cooper-Bessemer Expands Facilities in Northwest

*C. R. JONES*

Operators of Cooper-Bessemer equipment in Wyoming, Montana, and Central Canada are now being benefited by a new local diesel service as a result of Cooper-Bessemer Corp. recently establishing field maintenance facilities in Great Falls, Mont.

In charge is C. R. Jones who is assisted by A. A. Rothenbuhler, resident Cooper-Bessemer service engineer. The facilities include the warehousing of essential engine, compressor, and pump parts for Cooper-Bessemer equipment. In addition, the service includes maintenance facilities for diesel engines on draglines and on pumps used in refineries and on pipe-line transmission systems in the area.

## Christensen Names Three New Representatives

Christensen Diamond Products Co. has broadened its sales distribution to include California, Canada, and foreign countries by naming firms to represent its products in those areas.

Mercury Oil Tool Co., of Los Angeles, has been named to represent Christensen sales and service in California. Mercury also has a branch office in Bakersfield.

R. J. Eiche & Associates, Inc., has been named as export representative for Christensen. The export firm has offices in both Los Angeles and New York City.

To represent the firm in Canada, Christensen has named James E. Emrick Co. of Edmonton, Alta. O. L. Wooten is manager of the Canadian representation.

## Midwest Piping & Supply Advances P. R. Becker

Phil R. Becker has been appointed sales manager of the welding fittings division of Midwest Piping & Supply Co., Inc., it has been announced by A. G. Stoughton, president. The company's executive offices are in St. Louis. Its plants are in St. Louis, Passaic, N. J., Los Angeles, and Boston.

Becker joined the Midwest firm 10 years ago and worked for 2 years in the engineering department on detailing and designing on fabricated piping and coils. He joined the welding fittings division in 1941 and, until 1945, worked in engineering and production control. Since 1945 he has devoted his entire time to sales in the welding fittings division.

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# CALENDAR

**January**

Society of Automotive Engineers, annual meeting Hotel Book-Cadillac, Detroit, January 9-13.

**February**

Southern Gas Association, meter and regulator conference, Houston, February 9-10.

American Institute of Mining and Metallurgical Engineers, annual meeting, Hotel Statler, New York, February 12-16.

American Institute of Chemical Engineers, regional meeting, Houston, February 26-March 1.

American Society for Testing Materials, spring meeting, Hotel William Penn, Pittsburgh, February 27-March 3.

**March**

American Petroleum Institute, Division of Production, Southwestern District meeting, Adolphus Hotel, Dallas, March 8-10.

Indiana Independent Petroleum Association, spring convention, Hotel Severin, Indianapolis, March 9-10.

North Texas Oil and Gas Association, Kemp Hotel, Wichita Falls, March 25.

Southern Gas Association, Galveston, Tex., March 27-29.

Western Petroleum Refiners Association, annual meeting, Plaza Hotel, San Antonio, March 27-29.

American Petroleum Institute, Division of Production, Mid-Continent district meeting, Skirvin Hotel, Oklahoma City, March 29-31.

**April**

National Association of Corrosion Engineers, annual conference, Jefferson Hotel, St. Louis, Mo., April 4-7.

American Society of Mechanical Engineers, Hotel Statler, Washington, D. C., April 10-14.

Southwestern Gas Measurement Short Course, University of Oklahoma, Norman, Okla., April 11-13.

National Petroleum Association, Hotel Cleveland, Cleveland, Ohio, April 12-14.

American Petroleum Institute, Division of Production, Rocky Mountain district meeting, Gladstone Hotel, Casper, Wyo., April 13-14.

Natural Gasoline Association of America, annual convention, Texas Hotel, Fort Worth, April 24-26.

Oil Heat Institute of America and National Oil Heat Exposition, annual meeting, Commercial Museum, Philadelphia, April 24-May 1.

American Petroleum Institute, Division of Production, eastern district meeting, Cleveland Hotel, Cleveland, April 26-28.

**May**

American Petroleum Institute, Division of Refining, midyear meeting, Hotel Cleveland, Cleveland, May 1-4.

Interstate Oil Compact Commission, spring meeting, Biloxi, Miss., May 4-6.

Independent Petroleum Association of America, midyear meeting, Biltmore Hotel, Los Angeles, May 7-9.

National Stripper Well Association, Biltmore Hotel, Los Angeles, May 7-9.

American Gas Association, Natural Gas Department, spring meeting, Mayo Hotel, Tulsa, May 8-9.

Liquefied Petroleum Gas Association, annual convention, Palmer House, Chicago, May 8-11.

American Petroleum Institute, Division of Production, Pacific Coast district meeting, Biltmore Hotel, Los Angeles, May 11-12.

American Gas Association, production and chemical conference, Hotel New Yorker, New York, May 22-24.

American Institute of Chemical Engineers, regional meeting, New Ocean House, Swampscott, Mass., May 28-31.

**June**

National Oil Scouts and Landmen's Association, Skirvin Tower Hotel, Oklahoma City, June 8-10.

American Society of Mechanical Engineers, oil and gas power division, Lord Baltimore Hotel, Baltimore, June 12-16.

American Society of Mechanical Engineers, Hotel Statler, St. Louis, June 19-23.

Pennsylvania Grade Crude Oil Association, Hotel William Penn, Pittsburgh, Pa., June 15-16.

Canadian Gas Association, annual convention, Manior Richelieu Hotel, Murray, Quebec, Canada, June 20-24.

American Petroleum Institute, midyear division of production and standardization conference, Brown Palace Hotel, Denver, June 26-30.

American Society for Testing Materials, annual meeting Chalfonte-Haddon Hall, Atlantic City, N. J., June 26-30.

**August**

Interstate Oil Compact Commission, summer meeting, French Lick, Ind., August 3-5.

**September**

American Society of Mechanical Engineers and Instrument Society of America, Municipal Auditorium, Buffalo, N. Y., September 11-15.

National Petroleum Association, Hotel Traymore, Atlantic City, N. J., September 13-15.

American Society of Mechanical Engineers, petroleum mechanical engineering conference, Roosevelt Hotel, New Orleans, September 25-27.

**October**

American Gas Association, annual convention, Atlantic City, N. J., October 2-6.

Mid-Continent Oil and Gas Association, Texas division, Dallas, October 4-5.

American Association of Oilwell Drilling Contractors, annual meeting Mayo Hotel, Tulsa, October 9-10.

**November**

American Petroleum Institute, annual meeting, Biltmore and Ambassador Hotels, Los Angeles, November 13-16.

American Society of Mechanical Engineers, Hotel Statler, New York, November 26-December 1.

**NOMADS**

Tulsa Nomads, **third Friday of each month. After Five Room, Tulsa Hotel.**

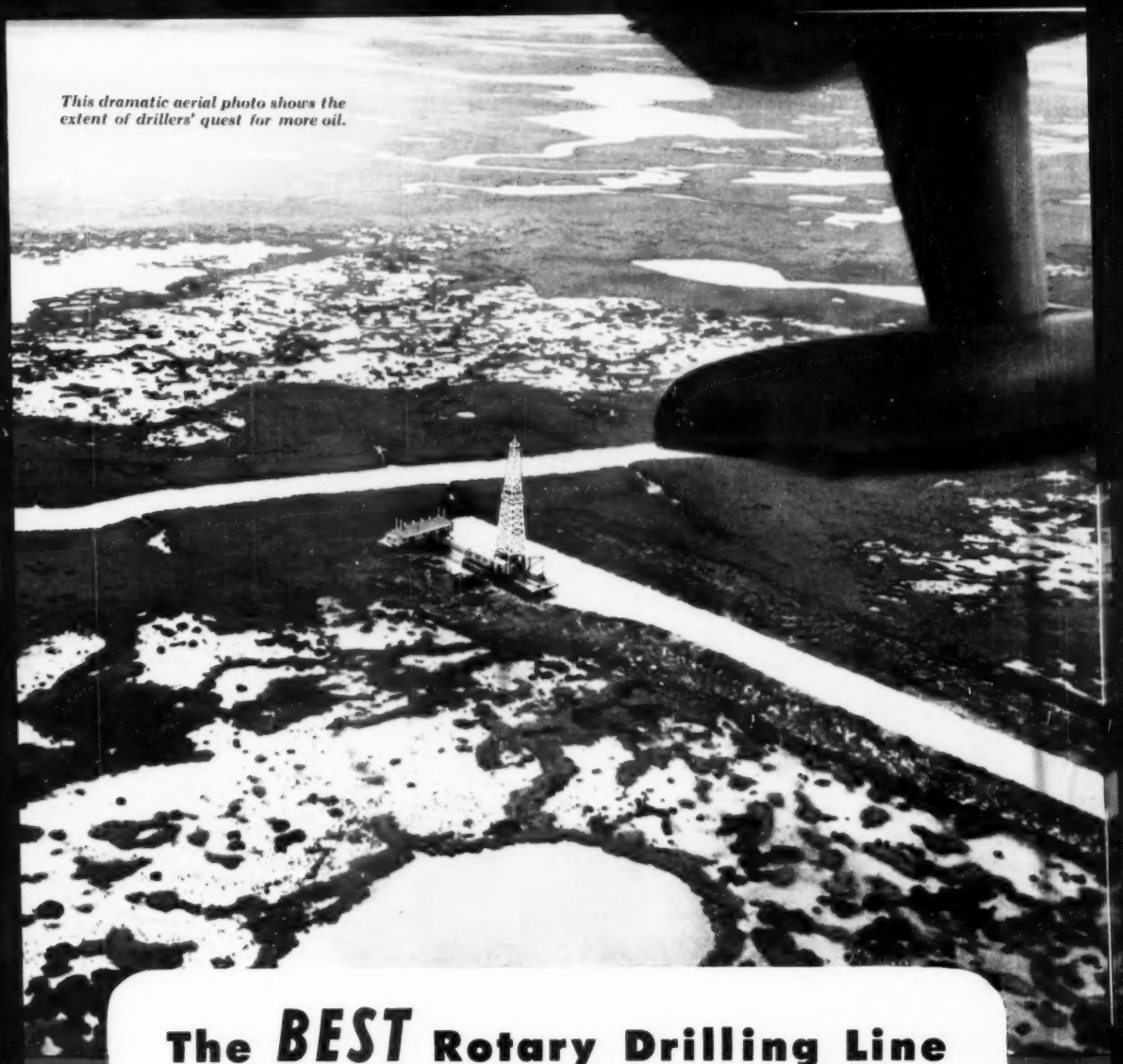
Dallas Nomads, **first Monday of each month, Texas Room, Baker Hotel.**

Houston Nomads, **second Monday of each month, Ye Ole College Inn, Houston.**

Los Angeles Nomads, **second Wednesday of each month, Jonathan Club.**

**LEGAL**

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D. C. Notice is hereby given that two units of land containing in all 280 acres in T. 32 N., R. 19 E., P.M., Montana, within the known geologic structure of the North Bowes field, will be offered for oil and gas leasing, through competitive bidding, at 1 p.m. on February 1, 1950, when bids will be open. The details of the lease offering, how and where to file bids, and a description of the lands may be obtained by addressing an inquiry to the Manager at the District Land Office, at Billings, Montana, or to this office. Marion Clawson, Director.



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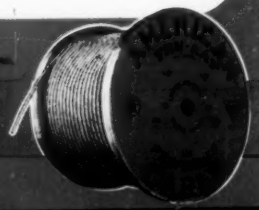

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